

# EXHIBIT J

# ARTHUR B. ROBINSON CENTER ON CLIMATE AND ENVIRONMENTAL POLICY

A Project of The Heartland Institute

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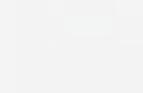
 <p>MAY 29, 2019 <b>Tesla Posts Big Losses as Government Subsidies Wane</b> By H. Sterling Burnett</p> <p>Tesla reported losses of \$702 million during the first quarter of 2019, breaking a streak of two straight quarters posting a profit.</p>	<p>Tags Energy</p>
 <p>MAY 29, 2019 <b>Florida Legislature Approves International Drug Purchasing</b> Florida has joined Colorado, Missouri, Utah, Vermont, and West Virginia in attempting to save money on prescription drugs by importing them from another country.</p>	<p>Tags Health Care</p>
 <p>MAY 29, 2019 <b>States Move to Exempt Direct Primary Care from Insurance Regulations</b> In an effort to encourage more consumer-driven health care provider models, a growing number of states are moving to exempt direct primary care (DPC) from insurance regulations.</p>	<p>Tags Health Care Regulation</p>
 <p>MAY 29, 2019 <b>Non-Physician Practitioner Bill Fails in Florida Senate</b> By Ashley Herzog</p> <p>Proponents are not giving up the fight to expand the role of non-physician health care practitioners in Florida after a bill that would have allowed practitioners to work independently of doctors.</p>	<p>Tags Health Care</p>
 <p>MAY 28, 2019 <b>Tennessee Passes Education Savings Account Legislation</b> By Juliana Knot</p> <p>The Tennessee General Assembly passed legislation establishing an education savings account program supported by Gov. Bill Lee.</p>	<p>Tags Education Government Spending</p>
 <p>MAY 28, 2019 <b>New UN Report on Looming Mass Extinctions Exposed in US House Testimony</b> By Gregory Wrightstone</p> <p>A new UN report warns that "around 1 million species already face extinction, many within decades."</p>	<p>Tags Environment Climate Change</p> <p>Type Opinion/Editorial</p>
 <p>MAY 28, 2019 <b>Heartland Weekly: The Biggest Lesson from 'Game of Thrones'</b> By Jim Lakely</p> <p>Week of May 20, 2019</p>	<p>Tags Government &amp; Politics Climate Change Environment Energy Education Health Care Government Spending</p> <p>Type Opinion/Editorial</p>
 <p>MAY 28, 2019 <b>Proposed FDA Rule on Biosimilars Suffix Sparks Industry Concerns</b> By AnneMarie Schieber</p> <p>The biosimilar drug industry, along with consumer, taxpayer and health care groups are crying foul over the Food and Drug Administration's newly released guidelines requiring a four-letter suffix on biosimilar drug names that would distinguish them from</p>	<p>Tags Health Care Regulation</p>
 <p>MAY 28, 2019 <b>Bills Before Congress Would Allow Use of Health Savings Accounts for Direct Primary Care Dues</b> Congress is considering legislation that would modify the federal tax code to allow the use of pretax health savings accounts (HSAs) to pay for the noninsurance payment model of direct primary care (DPCs).</p>	<p>Tags Health Care</p>
 <p>MAY 27, 2019 <b>Federal Government To Offer One Million Acres in California for Oil and Gas Development</b> By H. Sterling Burnett</p> <p>The Trump administration's Bureau of Land Management has offered a detailed plan to open more than a million acres of public and private land in California to oil and gas development, including through the use of fracking.</p>	<p>Tags Energy Environment</p>

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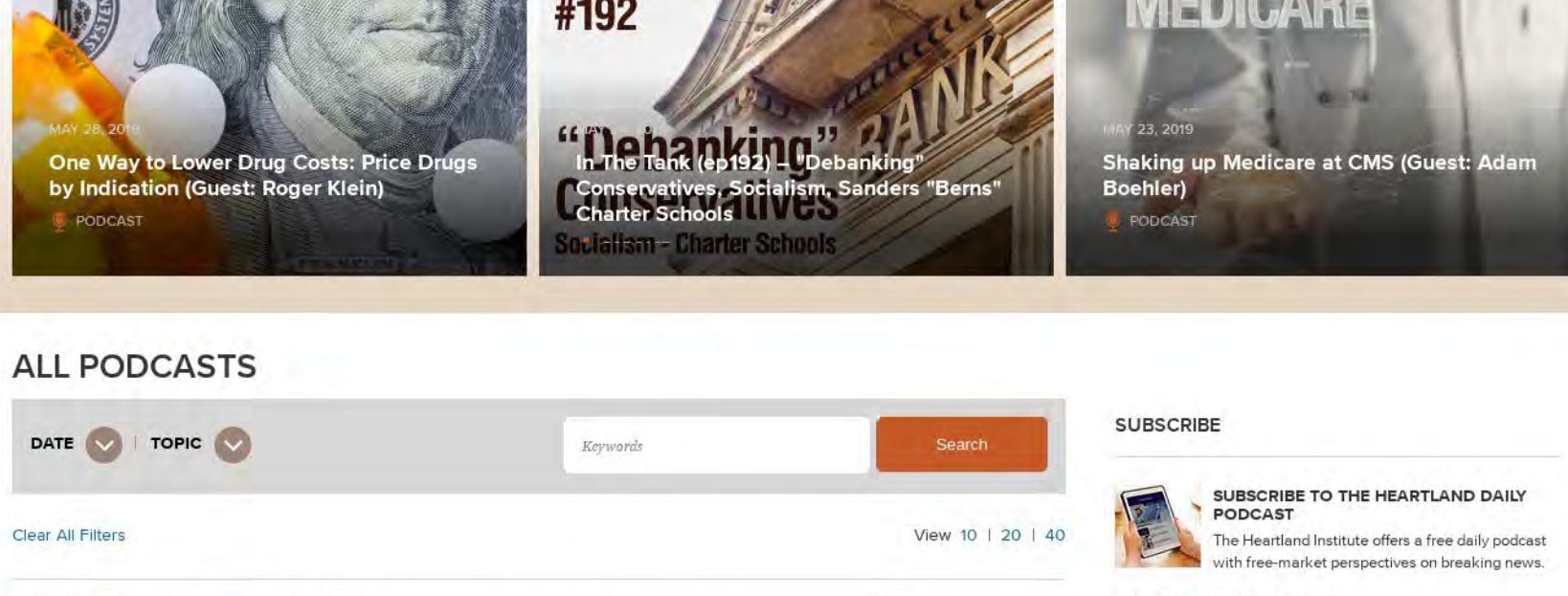
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**New UN Report on Looming Mass Extinctions Exposed in US House Testimony**  
By Gregory Wrightstone

 MAY 28, 2019  
**Heartland Weekly: The Biggest Lesson from 'Game of Thrones'**  
By Jim Lakely

 MAY 28, 2019  
**Special Edition on Agriculture and Climate Change**  
By H. Sterling Burnett

 MAY 20, 2019  
**Heartland Weekly: Free To Choose Medicine Offers Hope for Patients**  
By Jim Lakely

## PODCASTS



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MAY 28, 2019  
**One Way to Lower Drug Costs: Price Drugs by Indication (Guest: Roger Klein)**

By AnneMarie Schieber

Rather than government mandated price controls on drugs, why not have drug companies base prices on indication? Roger D. Klein discusses "indication specific" drug prices and how this might lower prices and improve health outcomes.

Tags  
Health Care

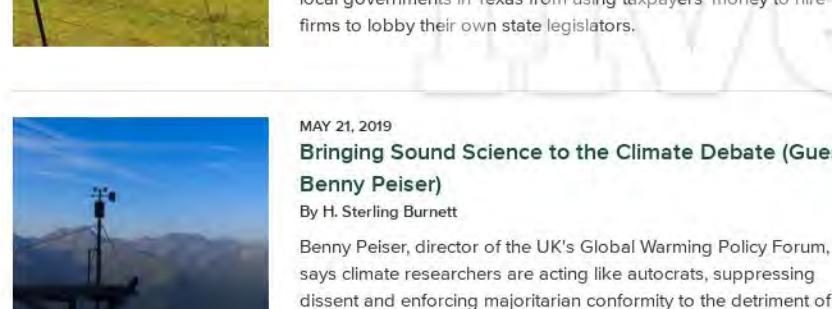


MAY 24, 2019  
**In The Tank (ep192) – "Debanking" Conservatives, Socialism, Sanders "Banks" Charter Schools**

By Donny Kendal, Justin Haskins, Jim Lakely

Heartland's Donald Kendal, and Justin Haskins are joined by Jim Lakely in episode #192 of the In The Tank Podcast. Today's episode features work from Gallup, the National Center for Public Policy Research, and the National Review Institute.

Tags  
Taxes

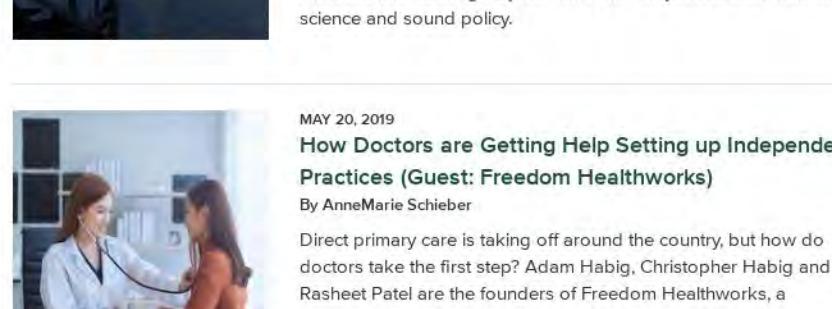


MAY 23, 2019  
**Shaking up Medicare at CMS (Guest: Adam Boehler)**

By Sarah Lee

Adam Boehler, a Trump administration appointee who runs the Center for Medicare and Medicaid Services' (CMS) Innovation Center, details a new voluntary payment model that moves Medicare primary care payments away from fee-for-service

Tags  
Health Care

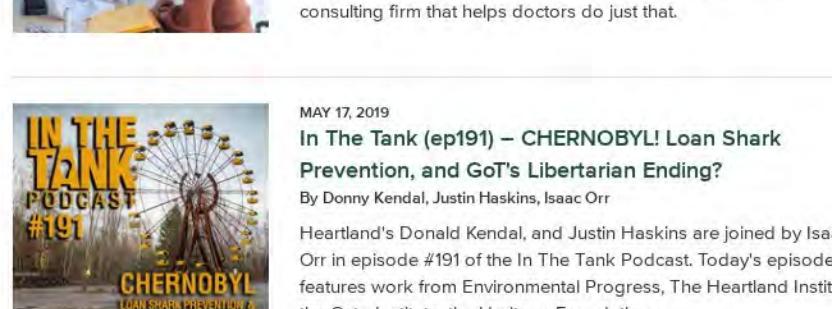


MAY 22, 2019  
**Taxpayer-Funded Lobbying and Alternative Conservative News in Texas (Guest: Konni Burton)**

By Joe Barnett

Former Texas State Sen. Konni Burton joins the podcast to discuss some of the issues she championed in the Senate, such as banning local governments in Texas from using taxpayers' money to hire firms to lobby their own state legislators.

Tags  
Government Spending



MAY 21, 2019  
**Bringing Sound Science to the Climate Debate (Guest: Benny Peiser)**

By H. Sterling Burnett

Benny Peiser, director of the UK's Global Warming Policy Forum, says climate researchers are acting like autocrats, suppressing dissent and enforcing majoritarian conformity to the detriment of science and sound policy.

Tags  
Climate Change  
Environment



MAY 20, 2019  
**How Doctors are Getting Help Setting up Independent Practices (Guest: Freedom Healthworks)**

By AnneMarie Schieber

Direct primary care is taking off around the country, but how do doctors take the first step? Adam Habig, Christopher Habig and Dr. Rasheet Patel are the founders of Freedom Healthworks, a consulting firm that helps doctors do just that.

Tags  
Health Care



MAY 17, 2019  
**In The Tank (ep191) – CHERNOBYL! Loan Shark Prevention, and GoT's Libertarian Ending?**

By Donny Kendal, Justin Haskins, Isaac Orr

Heartland's Donald Kendal, and Justin Haskins are joined by Isaac Orr in episode #191 of the In The Tank Podcast. Today's episode features work from Environmental Progress, The Heartland Institute, the Cato Institute, the Heritage Foundation.

Tags  
Taxes

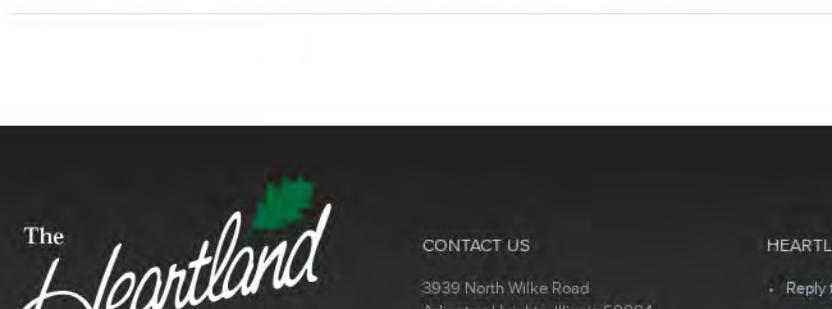


MAY 17, 2019  
**Collaborative Dialogue to Maintain a Free Society (Guest: Marsha Familaro Enright)**

By Lennie Jarratt

Marsha Familaro Enright asserts that collaborative dialogue and widespread educational reform can lead to a freer society.

Tags  
Education



MAY 16, 2019  
**Big Green Lobbying in Canada (Guest: Robert Lyman)**

By H. Sterling Burnett, Robert Lyman

Big Green environmental non-profit organizations have a large impact on Canadian energy policy and the source of their funding and the amount they spend on partisan government lobbying has been hidden for far too long. Its time for transparency.

Tags  
Climate Change



MAY 15, 2019  
**State Issues and Heartland's Government Relations Team (Guest: George Jamerson)**

By Joe Barnett

George Jamerson, Director of Government Relations at the Heartland Institute joins the podcast to talk about some of the issues facing state legislators today, and the assistance and support Heartland's government relations team provides.

Tags  
Government Spending

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SEPTEMBER 22, 2016

'Vaping Tax' Vote Clouded by Circular Reasoning

By Michael Hamilton

NOVEMBER 10, 2009

2009 November Health Care News: Protests Lead White House to Reconsider Reform



AUGUST 9, 2016

A Young Person's Guide to Energy Conservation

By James H. Rust



## CLIMATE CHANGE VIDEOS



### Why Scientists Disagree About Global Warming FAQ: Is the science in the book peer-reviewed?

0:48 | MAY 23, 2017

Surveys show a large percentage of teachers are skeptical that human activity is causing a climate crisis, but they have access to a one-sided alarmist view of the subject that dominates text books for public and private schools. The Heartland Institute sent copies of "Why Scientists Disagree About Global Warming" to more than 300,000 K-12 and college-level teachers all across America to ensure they have a resource to teach the controversy about this subject, and have in hand some of the scientific arguments that counter climate alarmism. As Heartland's Tim Benson explains in this video, the science in the book comes from the peer-reviewed scientific literature, and is but one chapter in a large, upcoming volume of peer-reviewed data and analysis in the Climate Change Reconsidered series from the Nongovernmental International Panel on Climate Change. See a free PDF copy of the book at this link: <https://www.heartland.org/publications-resources/publications/why-scientists-disagree-about-global-warming>



### Why Scientists Disagree About Global Warming FAQ: Is the science in the book peer-reviewed?

0:48 | MAY 23, 2017



### RAW CBS Evening News Interview of Heartland Institute President Joseph Bast

5:56:39 | APRIL 23, 2017



### Climate "realists" want U.S. to stop spending money on climate change

5:54 | APRIL 22, 2017



### Lukewarming – a Discussion with Climate Scientist Patrick Michaels of the Cato Institute

6:20:59 | APRIL 20, 2017



### The Australian Libertarian: An Evening with Sen. David Leyonhjelm

6:07:26 | APRIL 13, 2017



### Man-caused Global Warming: The Greatest Scam in World History

2:27:17 | NOVEMBER 18, 2016



### No Certain Doom: On the Accuracy of Projected Global Average Surface Air Temperatures

1:52:42 | JULY 30, 2016



### Fred Goldberg - Can Humans Cause Global Warming with CO2 Emissions From the Burning of Fossil Fuels?

6:20:44 | MARCH 16, 2016



### Why Scientists Disagree About Global Warming: Joseph Bast

6:26:14 | MARCH 10, 2016



### Nobel Laureate in Physics: "Global Warming is Pseudoscience"

1:25:42 | DECEMBER 17, 2015



### Robert Carter @ COP21

24:39 | DECEMBER 3, 2015



### Myron Ebell, ICCC10 (Panel 14: Action Items for Policymakers)

21:06 | JULY 15, 2015

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# EXHIBIT K



BLOG COOLER HEADS DIGEST CONTRIBUTORS

### About

GlobalWarming.org is a project of the Cooler Heads Coalition, formerly a sub-group of the National Consumer Coalition, but now run as an informal and ad-hoc group focused on dispelling the myths of global warming by exposing flawed economic, scientific, and risk analysis. Coalition members will also follow the progress of the international Global Climate Change Treaty negotiations.

This website is paid for and maintained by the [Competitive Enterprise Institute](#).

### The History of the Cooler Heads Coalition

The [National Consumer Coalition](#) was formed by Consumer Alert in late 1996 as an on-going coalition of market-oriented national and state-level policy and activist groups, which focus on consumer issues in the policy arena. NCC's issue work was done by its sub-groups of which Cooler Heads was one. Each sub-group focuses on a specific issue, such as internet privacy, global climate change, and health care, and includes experts from the member organizations who study that issue. Since then, Consumer Alert and the NCC have ceased operation, but the Cooler Heads Coalition has remained and continues its mission.

### Members

- [Alexis de Tocqueville Institution](#)
- [Americans for Prosperity](#)
- [Americans for Tax Reform](#)
- [American Legislative Exchange Council](#)
- [American Policy Center](#)
- [America's Future Foundation](#)
- [Committee for a Constructive Tomorrow](#)
- [Competitive Enterprise Institute](#)
- [Fraser Institute, Canada](#)
- [Freedom Works](#)
- [Frontiers of Freedom](#)
- [George C. Marshall Institute](#)
- [Heartland Institute](#)
- [Independent Institute](#)
- [Istituto Bruno Leoni, Italy](#)
- [JunkScience.com](#)
- [Lavoisier Group, Australia](#)
- [Liberty Institute, India](#)
- [National Center for Policy Analysis](#)
- [Pacific Research Institute](#)
- [Seniors Coalition](#)
- [60 Plus Association](#)
- [Small Business and Entrepreneurship Council](#)

### COOLER HEADS DIGEST

First Name \*

Last Name \*

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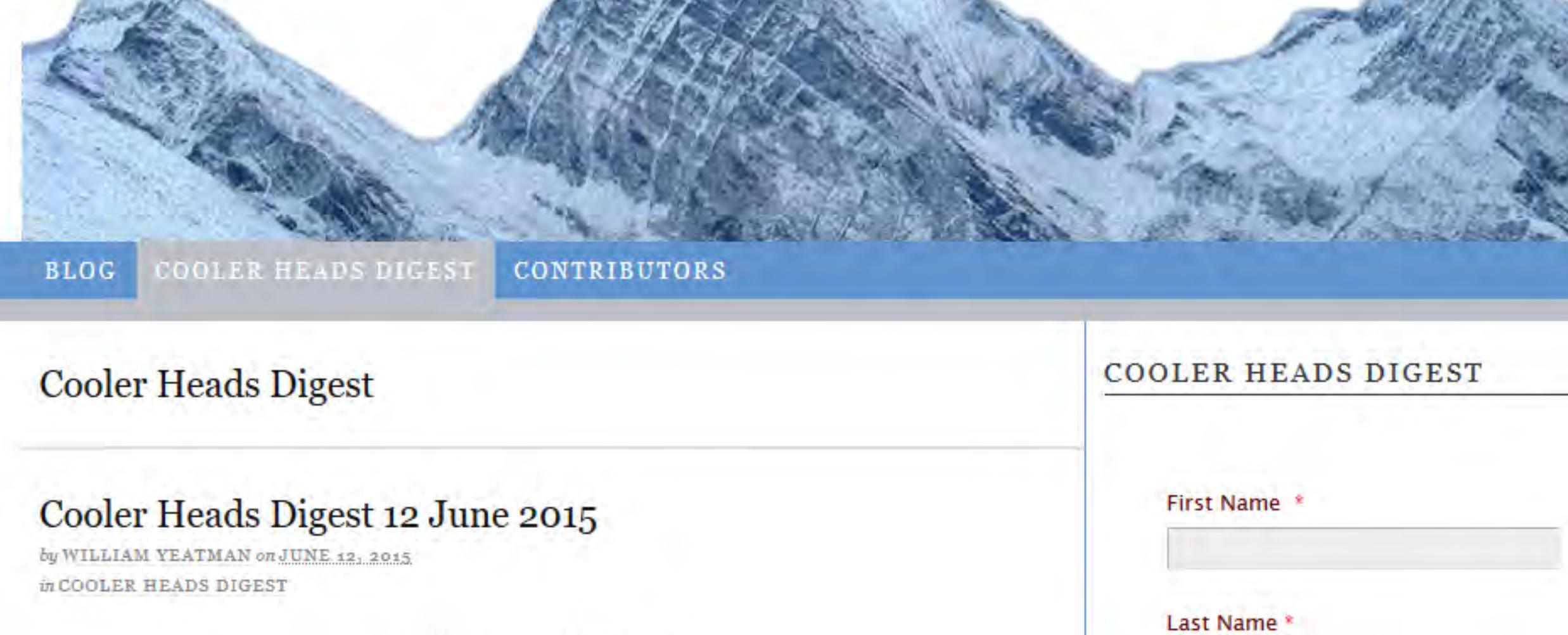
### CONTRIBUTORS

#### **CONTRIBUTORS**

MYRON EBELL

MARLO LEWIS

CHRIS HOPPER

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## Cooler Heads Digest

### Cooler Heads Digest 12 June 2015

*by WILLIAM YEATMAN on JUNE 12, 2015**in COOLER HEADS DIGEST*[Cooler Heads Digest 12 June 2015](#)

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### CONTRIBUTORS

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CHRIS HORNER

### Cooler Heads Digest 6 March 2015

*by WILLIAM YEATMAN on MARCH 6, 2015**in BLOG, COOLER HEADS DIGEST*[Cooler Heads Digest 6 March 2015](#)

### Cooler Heads Digest 27 February 2015

*by WILLIAM YEATMAN on FEBRUARY 28, 2015**in COOLER HEADS DIGEST*[Cooler Heads Digest 28 February 2015](#)

### Cooler Heads Digest 13 February 2015

*by WILLIAM YEATMAN on FEBRUARY 13, 2015**in COOLER HEADS DIGEST*[Cooler Heads Digest 13 February 2015](#)

### Cooler Heads Digest 6 February 2015

*by WILLIAM YEATMAN on FEBRUARY 6, 2015**in COOLER HEADS DIGEST*[Cooler Heads Digest 6 February 2015](#)

### Cooler Heads Digest 30 January 2015

*by WILLIAM YEATMAN on JANUARY 30, 2015**in BLOG, COOLER HEADS DIGEST*[Cooler Heads Digest 30 January 2015](#)

### Cooler Heads Digest 19 December 2014

*by WILLIAM YEATMAN on DECEMBER 19, 2014**in COOLER HEADS DIGEST*[Cooler Heads Digest 19 December 2014](#)

### Cooler Heads Digest 12 December 2014

*by WILLIAM YEATMAN on DECEMBER 12, 2014**in BLOG, COOLER HEADS DIGEST*[Cooler Heads Digest 12 December 2014](#)[← PREVIOUS ENTRIES](#)

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## Major Reports Archive

[Mathematical Models vs. Real-World Data: Which Best Predicts Earth's Climatic Future?](#): How well are today's climate models able to predict what will happen to earth's climate in the years, decades and centuries to come if the atmosphere's carbon dioxide (CO<sub>2</sub>) concentration continues to rise as a result of mankind's continued burning of fossil fuels such as coal, gas and oil? In this [document](#) this question is broached via a thorough and careful scrutiny of the pertinent scientific literature that has addressed this topic as it pertains to several important climatic phenomena.

[Stewardship and Sustainable Development in a World of Rising Atmospheric CO<sub>2</sub> Concentration -- A Biblical Perspective on Humanity's Relationship to the Biosphere](#): Protecting the environment has become a key consideration in almost all that we do; for it is put forth as a self-evident fact that being good to the Earth is the only way to ensure that our children and grandchildren will inherit a world that provides equal or greater opportunities and resources than that in which we now live. But who decides what is right and what is wrong in this regard? For a sizable segment of earth's population, such answers are found in the Bible. Comprised of writings dating back thousands of years, this sacred book serves as an ethical compass for people of numerous faiths. It records historical events that reach back to the world's beginnings, and contains prophetic writings that foretell the world's future. But does the Bible cast any light on society's stewardship role with respect to the environment and the other forms of life with which we share the planet? This question must be seriously considered; for if it does, that light would be incredibly important, as it would have to be acknowledged as coming from God Himself. And who is better qualified to settle differences among earth's many life [forms](#) than He who created and placed them here?

[Extreme Weather Events: Are they Influenced by Rising Atmospheric CO<sub>2</sub>?](#): Multiple climate models project that rising atmospheric carbon dioxide concentrations will increase the frequency and/or severity of a number of extreme weather events. This projection has been accepted as fact by numerous scientific organizations and government agencies, including the U.S. EPA. Such claims, however, often fail to stand up against appropriate scientific scrutiny. When key principles of scientific inquiry are adequately addressed and followed, the model projections are consistently seen to conflict with real-world observations, indicating it is highly unlikely that increasing temperatures--whether or not they are driven by rising atmospheric CO<sub>2</sub>--will increase the frequency and/or magnitude of severe weather events. In fact, most evidence to date suggests an opposite effect, where rising temperatures would produce less frequent and less severe extreme weather.

[The Positive Externalities of Carbon Dioxide: Estimating the Monetary Benefits of Rising Atmospheric CO<sub>2</sub> Concentrations on Global Food Production](#): Several analyses have been conducted to estimate potential monetary *damages* of the rising atmospheric CO<sub>2</sub> concentration. Few, however, have attempted to investigate its monetary *benefits*. This study addresses this discrepancy by providing a quantitative estimate of the direct monetary [benefits](#) of atmospheric CO<sub>2</sub> enrichment on both historic and future global crop production. Results indicate that the annual total monetary value of the increase in the air's CO<sub>2</sub> content (since the inception of the Industrial Revolution) for world crop production grew from \$18.5 billion in 1961 to over \$140 billion by 2011, reaching the staggering sum of *\$3.2 trillion* over the 50-year time period from 1961-2011. And projecting the monetary value of this positive externality forward in time reveals that it will bestow an *additional* \$9.8 trillion on crop production between now and 2050.

[The State of Earth's Terrestrial Biosphere: How is it Responding to Rising Atmospheric CO<sub>2</sub> and Warmer Temperatures?](#): Climate alarmists have long suggested it is in dire straits. Real-world observations, on the other hand, reveal that vegetative productivity and growth have been significantly increasing over the past century or more.

[Estimates of Global Food Production in the Year 2050: Will We Produce Enough to Adequately Feed the World?](#): Climate alarmists and -- icy makers should take notice of the findings of this important new analysis of the world at climate alarmists claim is needed to fight global warming will surely consign earth's of woe, while doing next to nothing in terms of altering the current warm phase of the :.

[Future: Pursuing the Prudent Path](#): The only truly objective method to evaluate climate paring them with real-world data. In this report we conduct just such an appraisal, tions against ten of the more ominous model-based predictions of what will occur in ess-as-usual anthropogenic CO<sub>2</sub> emissions: (1) unprecedented warming of the planet, (2) oods and droughts, (3) more numerous and stronger hurricanes, (4) dangerous sea level severe storms, (6) increased human mortality, (7) widespread plant and animal extinctions, luctivity, (9) deadly coral bleaching, and (10) a decimation of the planet's marine life due conjunction with these analyses, we proffer our view of what the future may hold with iological consequences of the ongoing rise in the air's CO<sub>2</sub> content, concluding by what we feel should be done about the situation.

[Coral Reefs: Prospects for the Future](#): The ongoing rise in the air's CO<sub>2</sub> content has been earth's coral reefs in two different ways: (1) by stimulating global warming, which has

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been predicted to dramatically enhance coral bleaching, and (2) by lowering the calcium carbonate saturation state of seawater, which has been predicted to reduce coral calcification rates. We evaluate the likelihood of such claims in a new major review paper.

12 January 2009

[Public Comment to the Environmental Protection Agency](#). A Public Comment (in [PDF format](#)) submitted to the EPA in response to the Environmental [Protection](#) Agency's Advanced Notice of Proposed Rulemaking on Regulating Greenhouse Gas Emissions Under the Clean Air Act, Docket ID No. EPA-HQ-OAR-2008-0318.

24 November 2008

[Carbon Dioxide and Global Change](#):

[Separating Scientific Fact from Personal Opinion](#). A critique of the 26 April 2007 testimony of James E. Hansen made to the Select Committee of Energy Independence and Global Warming of the United States House of Representatives entitled "Dangerous Human-Made Interference with Climate"

6 June 2007

[Enhanced or Impaired? Human Health in a CO<sub>2</sub>-Enriched Warmer World](#)

5 November 2003

[The Specter of Species Extinction](#):

[Will Global Warming Decimate Earth's Biosphere?](#)

29 July 2003

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<a href="#">Volume 21 (2018)</a>	<a href="#">Volume 13 (2010)</a>	<a href="#">Volume 6 (2003)</a>
<a href="#">Volume 20 (2017)</a>	<a href="#">Volume 12 (2009)</a>	<a href="#">Volume 5 (2002)</a>
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### [Copenhagen Climate Concerns](#)

Over 50 short (1 to 6 minute) YouTube videos expressing the concerns of many scientists and scholars about the Copenhagen Conference of Parties meeting in December 2009.

### [The Scientists Speak Video Series](#)

Short (1-4 minute) YouTube videos on various global warming related topics that can be viewed for [free](#) on our [website](#).

### [CO2 Truth-Alert Video Series](#)

Short (1-4 minute) YouTube videos on various global warming related topics that can be viewed for free on our [website](#).

### [Feature Documentaries](#)

Longer (27-53 minute) [feature](#) presentations, including the popular *Carbon Dioxide and the Climate Crisis* and *The Greening of Planet Earth* series.

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## CO2 Truth-Alert Archive

[Carbon Dioxide: Benefiting the Biosphere](#) (Uploaded 5 October 2017)

[Seeing is Believing](#) (Uploaded 9 April 2010)

[The Morality of Climate Change](#) (Uploaded 18 July 2009)

[Salvation on Demand](#) (Uploaded 24 April 2009)

[Free Energy is Not Cheap](#) (Uploaded 24 April 2009)

[Getting Real About Coal and Oil](#) (Uploaded 24 April 2009)

[Dirty Old Fuels](#) (Uploaded 24 April 2009)

[Climate Change in Copenhagen](#) (Uploaded 8 April 2009)

[Your "Carbon Legacy"](#) (Uploaded 18 March 2009)

[Elevated CO2: How Sweet it is ... for Sugarcane!](#) (Uploaded 12 January 2009)

[The Past Half-Century of Sea Level Rise](#) (Uploaded 5 November 2008)

[The Global Food and Water Crisis](#) (Uploaded 22 October 2008)

[China: Getting Greener \(In the Good Sense\)](#) (Uploaded 8 October 2008)

[Hurricane Katrina](#) (Uploaded 2 October 2008)

[Shrinking Glaciers and Presidential Politics](#) (Uploaded 26 September 2008)

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# EXHIBIT M

## Exhibit M: Mobil Advertisements

Mobil 1972 Jan 24 NYT: The \$66 Billion Mistake	1/24/1972
Mobil 1981 Feb 12 NYT: End the Coal Nightmare	2/12/1981
Mobil 1981 Jul 30 NYT: Health and Air Quality Standards	7/30/1981
Mobil 1981 Aug 6 NYT: Grand Canyonizing of America	8/6/1981
Mobil 1981 Aug 13 NYT: Cost of clean air	8/13/1981
Mobil 1982 Mar 26 NYT: Clean Air Act	3/26/1982
Mobil 1986 Oct 21 LAT: Taxes miss target	10/21/1986
Mobil 1989 Jul 6 NYT: People who live in greenhouses.	7/6/1989
Mobil 1990 Aug 2 NYT: Cooler heads of summer	8/2/1990
Mobil 1990 Sep 27 NYT: Delivering as promised	9/27/1990
Mobil 1990 Dec 13 NYT: Cows, bulls, and clean air	12/13/1990
Mobil 1992 Apr 2 NYT: Making sense out of nonsense	4/2/1992
Mobil 1993 Feb 18 NYT: When the goal is clean air	2/18/1993
Mobil 1993 Dec 9 NYT: Environment or Politics	12/9/1993
Mobil 1994 Jun 9 NYT: Voluntary industry regulation	6/9/1994
Mobil 1994 Oct 27 NYT: Who's in the driver's seat	10/27/1994
Mobil 1995 9 28 NYT: The sky is not falling	9/28/1995
Mobil 1996 Jul 18 NYT: Less heat, more light on climate change	7/18/1996
Mobil 1996 Jul 25 NYT: With climate change, what we don't know can hurt us	7/25/1996
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# The \$66 Billion Mistake

It seemed a great idea to most people, back in 1970, when Congress amended the Clean Air Act to require in 1976-model cars an average reduction of 95% in the three harmful automotive emissions from automobiles — 97% for hydrocarbons, 96% for carbon monoxide, and 93% for nitrogen oxides—over pre-control cars.

The problem is that with existing technology, the cost of controlling auto emissions rises at a fairly modest rate up to an average reduction of about 80%. Above that level, costs skyrocket. Each additional percentage point of reduction costs disproportionately more than the preceding percentage point.

Mobil's experts estimate it will cost Americans about \$100 billion in the decade beginning in 1976 to comply with the automotive-emission standards of the Clean Air Act. There is an alternative that will adequately improve air quality and will cost about \$34 billion. The difference between these two figures could be a \$66 billion mistake.

So an important question is: Is it necessary to go much beyond an average reduction of 80% to achieve clean air? If so, how far?

Emission controls and changes in engine design have already achieved far more than most people realize. Emissions in 1973-model cars have been reduced to an average of 66% below pre-control cars — over two-thirds of the way toward the federal goal. As a result, total automotive air pollu-

tion has been declining in the U.S. for several years—and will continue to decline in the years ahead, as older cars are scrapped, even though the car population is increasing.

Today's emission controls cost about \$65 to \$100 per car. But meeting the federal standards would require complicated control equipment that could cost \$500 per car—and maybe a lot more. Nobody knows the exact cost, because the required technology has not yet been proved.

There's an alternate solution, however, which we have labeled the California standards. These standards are similar to those recommended to Congress back in mid-1970 by the Department of Health, Education and Welfare. The standards California originally proposed for 1976 would reduce emissions by an average of 83% (94% for hydrocarbons, 81% for carbon monoxide, and 75% for nitrogen oxides) below pre-control cars. The controls required could cost about \$175 to \$300 per car.

What else makes up the \$66 billion difference between the 1976 federal standards and the standards California recommended?

Cars built to the federal standards could consume around 15% more gasoline per mile than California-standard cars. At a minimum, this would require refining an additional 30 million barrels of crude oil in 1976 and 150 million barrels a year by 1980. All of this additional oil would have to be

imported, with adverse effects on the U.S. balance of payments.

Maintenance and tune-up costs also would be higher.

And all this does not include the higher cost of the special gasoline that would be required.

The dilemma as we see it is that the federal government has legislated results by a specified date without knowing how or at what cost they could be achieved, if at all. We have learned in the past two years that both the difficulty and the costs of reaching the existing federal standards within the short time span allotted will be vastly greater than anyone knew at the time.

We are gratified to note that the U.S. Senate Public Works Subcommittee on Air and Water Pollution plans to hold hearings on the Clean Air Act soon. We hope the Senators will delve into all aspects of this problem and this legislation, including cost-benefits analyses of all the new technology developed in the past two years and the related information that has become available.

We hope also the Environmental Protection Agency will grant immediately the one-year extension already authorized in the Clean Air Act. And we further hope the Congress will substitute the feasible, relatively low-cost California standards for the federal standards.

This can help the country to avoid locking itself into a \$66 billion mistake.

# Mobil®

*This is the first in a series of advertisements on this subject.*

RICO Statement Exhibit 259

## You and the Clean Air Act—III

# The Cost of Clean Air

When a doctor gives you a prescription, you seldom ask how much the medicine will cost. But if the doctor also recommends a visit to a chic health spa, perhaps a long cruise in the Caribbean or a trip around the world, you probably start thinking hard about the bill—and whether it's worth the price. This kind of economic question, unfortunately, is one that the Clean Air Act fails to deal with when it specifies what emission controls are necessary.

The Environmental Protection Agency, by law, now establishes air quality standards with little regard to cost. Not surprisingly, the cost has turned out sky-high. By the government's own estimates, environmental controls required by the Clean Air Act from 1970 to 1987 will cost over \$400 billion at current prices. Yet serious questions can be raised as to whether the nation would be getting its money's worth.

Simple cost analysis shows that America could buy an equally effective air quality package far more cheaply. In some cases we're paying through the nose just for fancy wrapping. And sometimes we don't even know how much we're paying.

Current regulations, for example, require new coal-fired electric generators to remove 70 to 90 percent of the potential sulfur oxide emissions in any coal they use—regardless of how "clean" the coal already is. Thus, utilities using low-sulfur coal must install multimillion-dollar scrubbers just like power stations burning high-sulfur coal. The result: heavy expenditures to clean up emissions from coal that isn't that "dirty" to begin with.

Moreover, the law comes down heavily on new plants, which bear most of the burden of achieving air quality goals. It would make better economic sense to encourage power companies to spend their environmental dollars where they do the most good—whether on new plants or existing ones in the same region. A Business Roundtable study estimates that utilities could reduce their sulfur abatement costs by nearly 50 percent within the next decade—without any loss in air quality—if the clean air rules

were more flexible.

While greater flexibility in implementing the Clean Air Act definitely could save the country money, the more fundamental question is whether all the emission control requirements are worth the price America is being charged. Some of the more recent air quality standards seem to be classic examples of the law of diminishing returns. Regulations in the 1970 Act, for example, required utilities to remove more than 98 percent of the particulate matter emitted by coal-fired burners. According to estimates by National Economic Research Associates, a private consulting firm, 1977 Clean Air amendments mandating an additional one percent increase in the removal of particulates increased the cost by nearly 25 percent.

Up until now, the law hasn't required EPA to ask dollars-and-cents questions when determining national air quality standards. We think the American people should at least know what they're being charged—before standards are set. Such a revision would make good sense. Society—like individuals—does not have unlimited wealth, and it must allocate its resources wisely. Given the enormous incremental costs of such higher standards, America might be better off directing its resources into other areas. A frontal attack on cancer or heart disease, say, could affect many more people than the small groups singled out for "fail-safe" protection by many of our national air quality standards. Such policy questions, and alternate values, must be weighed in any discussion of the Clean Air Act.

We all want, and insist upon, clean air standards that protect human health. But can we really afford standards that jeopardize economic growth and energy development without a corresponding health benefit? Congress must steer a course that balances environmental needs with other national objectives—at a cost America can afford. The Clean Air Act needs fine tuning. Let's hope Congress does its job wisely. It's time to make the Clean Air Act work for America.



RICO Statement Exhibit 260

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## You and the Clean Air Act—II

# The Grand Canyonizing of America

The pristine air quality and scenic beauty of the Grand Canyon or Yosemite National Park are priceless treasures that all Americans cherish. But in its laudable efforts to protect the Grand Canyons of America, the Clean Air Act goes to needless extremes that affect every area of the country.

An integral part of the Clean Air Act is the concept of PSD—the effort to prevent any significant deterioration of air quality. PSD rules limit and sometimes prevent the construction of major facilities that might increase air pollution levels, even though the air would remain cleaner than health-based air standards require and the best available emission controls are used. Forget the economic benefits and new jobs a plant might bring. The sole concern of the PSD provisions is to maintain air quality—without any real consideration of cost.

Certainly some type of protection makes good sense in national parks, wildlife preserves, and other pristine regions. But the Clean Air Act, as it's now written, imposes PSD rules wherever air quality is cleaner than the national standards for any particular pollutant. There's hardly a spot in America that doesn't qualify, and today PSD rules, with the economic restrictions they bring, girdle the nation.

When applied to areas of the country outside wilderness spots and parklands, PSD regulations represent an extra, oftentimes onerous layer of red tape that does virtually nothing for public health and welfare. These considerations can easily be dealt with by the primary air quality standards, which are designed to protect human health, and secondary air quality standards, which protect the physical and natural environment.

PSD could have its greatest impact, ironically, not on air quality at all, but on other key national priorities—economic growth and energy development. In the West, for example, PSD rules could seriously jeopardize America's infant synfuels industry and stymie efforts to reduce U.S. dependence on foreign oil. Shale oil reserves in Colorado alone contain more than four times the energy potential of the country's entire oil reserves. Yet EPA officials themselves admit that PSD rules could limit oil shale production there to only a small fraction of what could be developed.

In most areas of the country, PSD rules could block further industrial growth by limiting emissions from new facilities so that air quality would

not be affected beyond a set increment over current levels. This "increment" rule must be met even when a larger increase would not affect public health or welfare. To prove that emissions from a proposed plant will meet EPA requirements, the prospective builder must spend a full year monitoring air quality to determine present air quality levels—which, among other things, form the baselines from which the increment is calculated. Then he must go through a costly permitting process, surviving a gauntlet of potential roadblocks and delays—for each covered emission.

Because of the tough "increment" restrictions and the enormous permitting difficulties, PSD regulations cast a pall over future industrial growth in America's urban regions. In the years ahead, they could prevent large factories from being built in areas of high unemployment, and make it impossible for oil-fired utilities to convert to coal—even where the air is clean enough to permit this without injury to health. Like a chapter out of *Catch-22*, PSD rules are often self-defeating, since they may delay or prevent companies from replacing older, less efficient plants with cleaner ones. The bottom line: higher operating expenses for business and dirtier air for the nation.

When rapidly deteriorating air quality was a top national priority, some form of nationwide PSD rules might have made sense. But America's air quality has been steadily improving in recent years. Between 1973 and 1978, for example, average annual concentrations of sulfur dioxide decreased 20 percent and carbon monoxide by close to a third. Moreover, today's new-model cars produce over 75 percent less emissions than 1967 models.

With today's unsettled economic conditions, and with America still heavily dependent on foreign energy, it's time for national policy to take a broader view of the environment, one that balances air quality with life quality—jobs, control over inflation, energy security, economic growth, social progress. Outside the nation's pristine regions, economic growth and energy development should be permitted, provided the best available control technology is used and proper review is carried out to ensure that health and welfare are not being harmed. It's time to make the Clean Air Act work for all of America's objectives.

RICO Statement Exhibit 261

# Let's end the coal nightmare

In a recent editorial, *The New York Times* argued that, despite what it called "regulatory nitpicking," coal mining in the western United States is not overregulated and that many of the complaints about overregulation seemed minor. "Coal's regulatory machinery does not cry out for rebuilding," stated *The Times*.

We were so astounded by this statement that we took a closer look at what is required in typical situations by federal and state authorities before a western coal mine can be started, and here is what we found:

Under present requirements, it can take well over four years from the time a company decides to extract coal from a western field to the day that ground can be broken to start building the mine. Tens of thousands of employee-hours are consumed just preparing the necessary applications—tomes with the heft of Webster's unabridged dictionary. This is costly not only to coal producers, but ultimately to the public as well.

No less than six federal agencies must be satisfied—the Office of Surface Mining, Environmental Protection Agency, Bureau of Land Management, U.S. Geological Survey, Department of Interior, and Council on Environmental Quality. State agency approvals vary, depending on the proposed mine's location, but they also can be numerous.

Preliminary paperwork proceeds on six simultaneous tracks, even though some permitting processes may have to await completion of others:

Track One. To meet state air quality regulations, the applicant must prepare the air quality permit application, a job that could take around eight months and can't begin until there's been at least 12 months of field monitoring to determine existing air quality conditions. After the application is submitted, the state agency involved performs its review and may request additional information, leading to a second review—a process which can expend another six months. Time elapsed before the permit is granted or rejected: approximately 26 months.

Track Two. Meanwhile, back at the federal level, the applicant must also produce complicated air quality documentation to get a PSD permit (Prevention of Significant Deterioration). Approval of the PSD permit can take 24 months or so,

including a review process that can stretch out over a year.

Track Three. Back with the state, the applicant busily prepares the state mining permit application, which requires time for environmental monitoring, permit preparation, agency reviews, and public comment. This can be a 42-month process before the permit is granted or rejected.

Track Four. The would-be mine operator, at the same time, must satisfy the federal requirements—more paperwork—of the National Pollutant Discharge Elimination System. If all goes well, this step can be completed in 6 months.

Track Five. This is the state facility siting permit which can take up to 24 months to negotiate. Involved is the gathering of data on the local community's social and economic environment and the development and approval of plans to preserve that quality of life. This is on top of the impact on wildlife, air, and water.

Track Six. Longest of the tracks is getting the federal mining permit approval from the Office of Surface Mining. After the applicant has laboriously prepared the application, OSM takes something like 10 months to ready a draft Environmental Impact Statement. Then come public reviews, the preparation of the final impact statement, and a joint review by OSM, the Department of Interior, and other agencies. Elapsed time: as long as 51 months.

All of these parallel processes are important, and all the bases have to be touched. But we seriously doubt that each process should rely on standards that may differ significantly and may even, on occasion, conflict.

Recently, after a year-long study, the U.S. Regulatory Council said: "The regulatory system affecting coal is like a jigsaw puzzle." The council found differing interpretations of regulations by OSM and state officials and overlapping and redundant reporting and permitting requirements.

One more fact has to be stated: Throughout this entire permitting process, the applicant faces the danger that these standards may be changed at any time by the agency staffs or by court action.

The issue isn't whether to regulate, but how. And finding the kind of regulatory formula that will enable America to put its coal resources to work is more than cosmetic surgery. What is needed, *The Times* notwithstanding, is a major overhaul, and it's long overdue.

## You and the Clean Air Act - I

# Health and air quality standards

In the decade the Clean Air Act has been on the books, there have been significant improvements in air quality. During the Seventies alone, the nation witnessed a 20 percent drop in average annual concentrations of sulfur dioxide and a one-third reduction in carbon monoxide levels. But the Clean Air Act, in many ways, has been a flawed law. Now the Act is up for reauthorization, and Congress is looking for ways to improve its procedures and adapt its philosophy to the needs and goals of the Eighties.

Such Congressional review is long overdue. Many of the studies used by the Environmental Protection Agency to set national ambient air quality standards, for example, are out of date and don't reflect current knowledge. Moreover, several groups have questioned the validity and methodology of some of these original studies.

The ozone or so-called smog standard, for instance, that limits the level of hydrocarbon emissions from factories and cars, was originally derived from disputed and largely inconclusive data. In one key study, never replicated, the researchers themselves were also test subjects—a very unscientific procedure. Although EPA slightly relaxed its original ozone standard, the agency still kept it about twice as strict as the level many in the medical community feel is needed to protect health. Emissions just from natural sources are believed sometimes to exceed EPA standards, so it's little wonder that many cities in the United States are currently not in compliance.

When a region fails to meet EPA-established national air quality standards for any particular pollutant, it is classified as a "non-attainment" area, to be saddled with heavy environmental restrictions that inhibit industrial growth and place huge economic burdens on local industries—and the consumers who buy from them. If a manufacturer in a non-attainment area wants to modify a unit

or build a new plant, he must somehow eliminate more air pollution in the surrounding area than his new facility will produce. In the desperate scramble to find suitable "offsets," petroleum companies in California, for example, have resorted to paving over secondary dirt roads—to keep down particulate matter—in exchange for EPA permission to produce heavy oil from the ground with steam generators.

Unfortunately, some parts of the country may be running out of offsets and, unless the law is changed, could find themselves unable to allow new plant construction. Sections of western and Gulf states, for example, may find themselves unable to produce needed petroleum or coal. And factories could be barred from areas of high unemployment in the Northeast. The Clean Air Act, in short, could damage the nation's industrial prospects and deny countless Americans the opportunity for economic betterment and social progress—without any accompanying improvement in health benefits.

Without aborting the drive to improve air quality in non-attainment areas, Congress has the opportunity to do away with most of these excesses—just by establishing realistic air quality objectives, based on solid scientific evidence—and by permitting greater flexibility in meeting these objectives. As America fights the battle for industrial revitalization, economic growth, and less dependence on foreign energy, the nation can no longer afford the cost of complying with unnecessarily strict air standards.

Everyone supports environmental laws that protect human health. But needlessly restrictive laws that jeopardize energy development and imperil economic growth do no one any good. In its review of the Clean Air Act, Congress should make sure that air standards are based on the latest scientific findings and medical evidence. It's time to make the Clean Air Act work for America in the Eighties.

# The 1970s model won't meet America's needs for the '80s

The Clean Air Act is up for reauthorization this year. As a nation, we must decide whether the legislative solutions tailored to the needs of the '60s and '70s are the correct solutions for the '80s. Clean air, of course, remains a key national priority. But today's environmental and economic conditions have changed. The law should adapt to reflect these new needs and realities.

To help update the Clean Air Act, the National Commission on Air Quality was asked to submit recommendations. The commission endeavored to reconcile a host of conflicting interests. But we believe it overlooked certain key facts and gave insufficient weight to America's pressing energy requirements and the current state of our economy.

The report does admit that the act "can affect energy development in certain areas." It acknowledges that newcomers—presumably energy developers as well—"will sometimes have difficulty" establishing major facilities. It concedes the act "could affect the number, size, and location of oil shale facilities" in the West and may be blocking the recovery of heavy oil in California. It admits that coal conversion in the Northeast "could be limited by the air quality standards." But then, having said all that, it concludes that "energy...expansion can proceed largely as planned" under current law.

Frankly, we fail to see how such a conclusion can be justified. The original Clean Air Act was formulated at a time when air quality was rapidly deteriorating in key areas of the nation. Energy was cheap and plentiful, and the economy was thriving. It made good sense then to channel more of the country's wealth into alleviating America's environmental problems. But three major events have since taken place:

1. The country has made enormous strides in improving air quality. Between 1973 and 1978, average annual concentrations of sulfur dioxide decreased 20 percent and carbon monoxide by close to a third. Moreover, today's new-model cars produce over 75 percent less emissions than 1967 models.

2. The oil embargo of 1973-74 and the curtailment in supplies caused by the situation in Iran have brought home the need to reduce U.S. dependence on foreign oil.

3. The U.S. economy has fallen off—so much so that the electorate has clearly demanded a new

emphasis on making the country more productive again.

Instead of trying to modify the ground rules so as to allow greater U.S. development of conventional fuels, the commission sticks with the same panaceas that fell short, even in the '70s, of meeting America's energy needs: namely, conservation and the development of renewable energy sources. But this falls far short of what's needed. With the bill for foreign oil nearing \$100 billion a year, inflation in excess of 10 percent, and some major industries in deep trouble, the nation can no longer afford the sky-high price of single-minded environmental zeal—especially since the benefits from incremental improvements in air quality have become progressively smaller relative to the cost. U.S. energy development can be encouraged, not discouraged as it has been. This can be consistent with air standards which protect public health.

Despite the sharp climb in OPEC oil prices and improvements in industry's ability to burn coal cleanly, the Clean Air Act has inhibited switchovers from oil to coal. In 1980, coal accounted for about the same share of U.S. energy use as it did in 1968. In New York, Consolidated Edison has been trying for the past eight years to convert three oil-fired plants to coal, the fuel they were originally designed to burn. Although the utility has finally obtained a key air quality permit, at least 26 more potential regulatory roadblocks still loom.

And the current Clean Air Act is complex, often redundant: A proposed energy facility may have to run the gauntlet of dozens of potential roadblocks and delays, for up to 17 different pollutants. Vice President Bush, who heads the President's regulatory-relief task force, is developing proposals to relieve some of these problems. But other, more serious problems can only be fixed by Congress.

The Clean Air Act has made a valuable contribution to America's environmental health. But we think that, in its present form, it does and will continue to impede development of America's energy resources. Congress should adapt the act to the '80s so it will not only protect health but also allow the nation to meet its economic goals and social priorities. And both require adequate energy.

## Taxes that miss the target

With all that has been written recently on tax theory and tax "reform," we find it incredible that nobody, to our knowledge, has decried an alarming trend in the way America's lawmakers choose to solve certain problems. The problems, such as toxic waste disposal and acid rain, affect society as a whole. But Congress is debating solutions based on special-purpose taxes aimed at specific industries.

Basically, here's why we feel special-purpose taxes are wrong:

- They are directed at those who are perceived as being able to pay, whether or not these handy targets caused the problem, and whether or not they can actually afford to pay.
- They depart from the concept that funds from the general treasury, raised from all the taxpayers, should be used to provide benefits for all. We're not saying that identifiable polluters, for example, shouldn't pay to clean up their messes. But when those responsible can't be found, and everybody benefits from the cleanup, we believe everybody should share in the costs.
- Such special-purpose taxes create special-purpose funds, and as a result, expenditures are often driven not by the size of the problem, but by the amount of money available.
- Special-purpose funds give rise to priority-setting and decision-making by a bureaucracy with its own direction and momentum—and without the proper annual review and supervision provided by the budget and appropriations processes.
- Finally, special-purpose taxes distort the free market. By targeting certain industries, they, in effect, subsidize others.

Some examples:

Superfund was created in 1980 to clean up orphan toxic waste sites—sites where the dumpers cannot be identified. Started as a \$1.6 billion program, Superfund has been financed almost totally by a tax on the oil and chemical industries—although other industries contributed much of the toxic wastes. Senate and House conferees recently agreed on a new Superfund program to cost \$9 billion over the next five years—in spite of protestations by the Environmental Protection Agency that it could efficiently spend only about \$5.3 billion.

To pay for the program, the tax on the oil industry was raised by more than 13 times to \$2.75 billion over the next five years. One industry—

oil—was singled out to pay for almost a third of the program. No other industry was asked to pay anything close to this amount. Part of the levy is a new tax on domestic and imported crude oil, which will raise the energy costs of American factories and farms, thus making them less competitive in world markets. American consumers will pay more and American exporters will be further disadvantaged in international trade.

Another example: The House is currently considering a measure to curb acid rain by imposing new limits on emissions from electrical power plants and other industrial facilities and by additional curbs on auto emissions. But the framers of the bill are worried about the impact of the legislation on residential users of electricity, because utility rates would have to rise by some undetermined amount as power plants either add costly hardware to their stacks or change to costlier fuels.

The proposed solution? A special-purpose tax on those utilities that burn coal or oil, collected by the federal government and dispensed in a manner to ensure that residential customers suffer no more than a 10 percent rate hike.

The implications are staggering. For one thing, major industrial users of electricity would see their costs go up—another favor to foreign producers. Consider, too, the bureaucracy of a federal agency—the EPA—sitting in Washington attempting to determine local conditions in 50 states, pondering at least 50 sets of utility rates and the basis for setting each of them. Where would this leave the 50 public utilities commissions already charged with this chore?

Sometimes, a special tax may have no special purpose beyond political expediency. The so-called "windfall profits" tax, imposed on oil in 1980, was never really a tax on profit; it was a tax on production. Uncollected now because oil prices are below its trigger price, the tax is still on the books, waiting for oil prices to recover. Meanwhile, it cost the industry almost \$74 billion in less than five years—money that went into the general treasury in spite of an early "commitment" to finance energy conservation and synthetic development.

In our view, Congress still has plenty of work to do in the area of genuine tax reform. And it might start by eliminating special-purpose taxes, and returning to the principle that the general treasury should finance the general good.

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# People who live in greenhouses...

Earth may be seen as a greenhouse that receives heat from the sun, radiates some back into space, and traps enough in the atmosphere to maintain a livable climate. Without this trapped heat the earth would be 60 degrees cooler and, to say the least, a far less livable home.

There's some possibility the temperature in our greenhouse is rising—and that certain gases associated with industrial activity and population growth may now be trapping more of the sun's energy than has been the case in the past. This phenomenon has been called the greenhouse effect. What should be done about it—and when and by whom—is now under discussion by industry, science, and government all around the world.

Global temperatures seem to be increasing. Over the last hundred years, the annual average is up by one degree Fahrenheit, with the warmest years coming recently, in the '80s. There's new evidence to suggest the oceans are getting both warmer and slightly higher than they had been. Scientists do not agree on the cause and significance of these changes—but many believe there's reason for concern about levels of "greenhouse gases" in earth's atmosphere.

Most of that atmosphere—over 99 percent—is made up of oxygen and nitrogen, which don't trap radiant heat. But certain trace gases do, and of these the major four—dubbed the greenhouse gases—are carbon dioxide, methane, nitrous oxide, and the man-made chemicals known as the CFCs, or chlorofluorocarbons.

Carbon dioxide is the most abundant of these trace gases in the atmosphere, but relatively the weakest in its heat-trapping attributes. Its concentration has been rising, primarily from the increased worldwide combustion of fossil fuels over the last 150 years or so, but also in part from deforestation. Scientists estimate that carbon dioxide causes about 50 percent of any greenhouse effect.

Methane is estimated to produce about 17 percent of that effect. A small part of this methane comes from the use or production of fossil fuels. But most of it is either from decomposing organic matter—like animal wastes and wood—or from natural or agricultural processes on the land, in peat bogs, swamps, and rice pad-

dies, for example.

Another 17 percent of the greenhouse effect—but this is the portion increasing fastest—is said to be caused by the CFCs. These manufactured chemicals, used in refrigeration, aerosols, and industrial solvents, are already restricted internationally because they were said to be destroying earth's protective upper-atmosphere ozone layer. The search for substitutes is in progress, and it's a safe guess that CFC production and use will eventually be eliminated. (Mobil makes no use of CFCs in its products.)

Nitrous oxide, which accounts for perhaps six percent of the greenhouse effect, comes into the atmosphere mainly from soil processes acting on nitrogen fertilizers, with a small amount produced in fuel combustion.

The principal focus in discussions about control of the greenhouse effect is on carbon dioxide and the CFCs. The latter are already being phased out by international agreement—which leaves reduction of carbon dioxide emissions at center stage.

The global climate is so huge and various that no easy formulas—or easy answers—apply. Nor do we fully understand the role of the oceans in absorbing and releasing carbon dioxide from and into the atmosphere. While much research remains to be done, we're already seeing worldwide pressure to reduce the atmospheric build-up of carbon dioxide. For this, there seem to be only two practical options: conservation in the use of fossil fuels, and vigorous development of alternative energy sources—those with less carbon, like natural gas, and those without carbon, such as nuclear power, solar, and hydroelectricity.

All must be explored as we face up to the possibility of global warming. Some public officials have targeted transportation fuels, but it's well to remember that in the whole world, highway vehicles account for only five percent of any warming trend. U.S. vehicles would account for not even half of this.

Mobil is very much aware that cleaner, more efficient, and more carefully used fossil fuels will cut the risk of global warming, and we're hard at work along all these fronts. We live in the greenhouse too.



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RICO Statement Exhibit 266

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# The cooler heads of summer

Return with us now to those chilling days of yesteryear—last December, when the worst cold spell in 60 years sent heating-oil prices right up the chimney. In the Northeast, where heating oil is a major fuel, the average household paid half again as much as it had the previous Christmas. And the search for Scrooge began.

Consumers naturally wanted a simple explanation, and some elected officials and interest groups responded with a ghost of Christmases past: Oil companies, they said, had rigged the shortage to inflate prices and profits.

Now, in the heat of summer, cooler heads prevail.

The U.S. Energy Information Administration has just finished analyzing that heating-oil crunch, and its report makes for some refreshing summer reading. The EIA told Congress that the most important factors were the weather, tight supplies and rising crude-oil prices. The official group found nary a cold-hearted corporate Grinch. Here's what it did find:

• The weather. Last winter was mild as well as frosty. Residential heating-oil prices first rose in response to the December cold snap, the EIA said, and "continued upward in January, reaching the highest levels experienced since...1983-84." But when the weather then turned unseasonably mild, "prices collapsed in February, largely offsetting the increases of the prior two months."

• Supplies. The EIA noted that "inventories seemed adequate as late as Thanksgiving," and December production hit "the highest level since at least 1982" in response to the freeze. But the cold snap also crippled refineries and the distribution network as machines and trucks broke down, pipelines

froze and barges were trapped in ice packs. Efforts to boost imports failed because Europe was also freezing; the EIA said high demand kept its heating oil at home.

Meanwhile, demand here surged 21 percent from November to December, compared with only nine percent a year earlier. And when the supply-demand balance gets so far out of whack, so do prices.

• Crude prices. Even as heating-oil prices were rising, so was the price of crude oil. That's economics at work, not conspiracy. As the EIA reported, "the lack of [heating-oil] price uniformity across companies...is indicative of the competitive process at work rather than the result of collusion." On a broader scale, the EIA said the heating-fuels market is now global, complex and, by implication, beyond manipulation by any company or group of companies.

Oil-company profits, the EIA said, benefited from the "unanticipated December runup in heating-oil prices." But profits suffered generally as crude-oil prices rose faster than the prices of such products as gasoline and diesel fuel. In addition, the harsh weather boosted operating costs, and heating-oil sales dropped when the weather turned mild. Oil companies made less money on their total marketing and refining operations than they had a year earlier, the EIA concluded.

Bottom line to the entire 1989-90 heating season from the EIA: "The industry and the consumer shared the extra costs."

We said last winter that market forces were at work, and the EIA has confirmed that the market as a whole functioned well under extremely difficult circumstances. It's something to remember now that most memories of the winter's crunch have been blown away by balmy breezes. And it's nice to see the overheated rhetoric blown away by the facts.



## Cows, bulls, and clean air

One recent commentary on the Clean Air Act hastily voted into law last October 27 struck us as symptomatic of a Congress that works in mysterious ways.

How, a nationally syndicated columnist wondered, could a clean air measure include \$19 million for a three-year study of the methane emissions from the flatulence of cows and other ruminant animals? The columnist didn't know—and neither do we—why such a study, valid as it may be, is part of this act.

But his question was no more fascinating than some of those we raised when the Clean Air Act was being debated. How costly would the measure prove? Would all its proposals really improve air quality? Had the Congress properly debated so technical a measure to be sure it was acting wisely?

Indeed, since the act was passed, new questions have to be asked: Is this the time to implement so costly and potentially unproductive a program now that the nation is in recession? Or would delay be more prudent?

We are particularly concerned with the provisions of the law that pertain to gasoline. They strike us as remarkably unscientific, and terribly expensive for the minimal gains they would achieve.

The fuel provisions were passed to address two different problems to which tail pipe emissions contribute—carbon monoxide and smog.

Starting in 1992, in the 41 parts of the country that have yet to attain compliance with the Environmental Protection Agency's standards for carbon monoxide (CO), all gasolines sold during the winter must contain 2.7 percent oxygen. The scientific and engineering communities agree that this will result in some reduction of CO. But there is also agreement that the benefit will be short lived. The carbon monoxide problem is worse in older cars than in new ones, and normal fleet turnover by itself will bring steady improvement.

The smog provisions are much more difficult to fathom. Starting in 1995, in the nine smoggiest metropolitan areas, the law mandates a formula for gasoline that has to include an oxygen content of two percent all year round, even though smog is

largely a summer problem. While oxygenated fuels may result in a lesser amount of some pollutants, they may produce larger amounts of others. The smog problem, therefore, may not be improved by oxygenated gasoline.

Furthermore, while this gasoline is required in only nine areas, about 90 additional areas could request its use. If that happens, gasoline manufactured to meet those requirements would likely become the standard all over the country at increased cost to the motorist for little benefit.

Moreover, nobody knows where all this oxygen is supposed to come from. Ethanol manufacturers favor corn-derived ethanol as the prime oxygenate source, but supply is uncertain at best, and ethanol is very expensive to make and is heavily subsidized by the taxpayers. For a number of reasons, including problems in transporting ethanol, most refiners prefer a substance called MTBE, but that too is in short supply.

The oxygenate capacity and other refinery facilities necessary to comply with the CO requirements by 1992 and the smog provisions in 1995 will require massive investments—some estimates are as high as \$25 billion. There is genuine concern over whether these facilities can be completed and in operation in time to meet the deadlines, just as there is doubt over whether the investment will provide the anticipated environmental benefits.

We aren't saying that the nation doesn't need a Clean Air Act. But we are proposing that the issues we've raised merit renewed debate and that the fuel provisions could stand fine-tuning.

The auto and oil industries will soon release the first report on a major study of how to make fuels and vehicles cleaner. California, certainly no slouch on environmental matters, has chosen to delay its own fuel regulations until late next year in order to study the emerging data.

Congress, in an election year, chose not to delay, but it's not too late to reconsider. Certainly there's reason to delay the oxygenate provisions, and to "fine-tune" some of the other provisions that may be impossible to meet, require huge outlays, and may not contribute to the solution of the stated problems.



# Delivering as promised

Here are two recent examples of how the private sector responds to public needs—one on clean water and one on clean air.

Just weeks after the March 1989 oil spill in Alaska's Prince William Sound, the oil industry formed a task force. Its mandate: to quickly come up with a better plan to prevent major spills in the future and clean up any that do occur.

Two months after its formation, the group recommended an ambitious and costly program, to be paid for entirely by the industry. On September 6, the industry delivered on its promise and launched the Marine Spill Response Corporation. MSRC will administer a new network for containing and cleaning up major oil spills throughout the U.S.—a network vastly larger than any other in the world.

With five regional response centers, MSRC will have state-of-the-art equipment and the best-trained people available to fight catastrophic spills in U.S. tidal and offshore waters. MSRC will also audit spill readiness and pursue an active research and development program on spills and the technology to clean them up. It will be fully operational in 30 months.

MSRC will need an estimated \$800 million for its first five years of operation, and those funds are coming entirely from an association of companies, including Mobil, that own, ship or receive crude oil and petroleum products. MSRC is completely independent.

While no one can guarantee that another major spill will never happen, MSRC will assure the best effort possible to prevent it and contain it if it does happen. But MSRC is also an example of how the private sector can respond to a pressing national need and deliver what it promises.

Then there's the need to improve air quality by reducing pollutants from automobile exhausts. Since the automakers and oil companies began addressing this problem decades ago, federal tests show that new cars emit 95 percent fewer hydrocarbons, 95 percent less carbon monoxide and 76 percent fewer nitrogen oxides. But ozone—or smog—continues to be a problem in certain areas.

Some ground-level ozone comes from the interaction between nitrogen oxides and hydrocarbons from auto emissions and sunlight. Congress is now putting the finishing touches on a Clean Air Act that could set new ground rules for the composition of automotive fuels.

And that's where the private sector comes in. Last year, shortly after the oil-spill task force was formed, the three major automakers and 14 oil companies, including Mobil, agreed to work together on the largest and most comprehensive research project ever undertaken on cleaner fuels and vehicles.

The Auto/Oil Air Quality Improvement Research Program is busy amassing a vast data base so that legislators and regulators will have better information to make their decisions.

In the first phase of that group's project, researchers are using 30 fuels meeting strict scientific criteria to power a cross section of cars and vans on the road today plus 20 flexible-fuel vehicles. Emission tests are done following federal test procedures. But the auto/oil industry program goes further than federal tests by measuring more than 150 compounds identified in the vehicle emissions.

The information gathered goes into a massive data base that's used by air modelers to determine how the fuels and engine systems might affect air quality in the New York City area, the Los Angeles Basin and the Dallas-Fort Worth region.

Phase One of this research effort is expected to be completed early next year, offering regulators a bigger and better scientific data base than anything ever seen before—one they can draw on as they seek to improve our air quality.

As some "experts" are rushing toward their pet solutions to the problem, let's remember that there's another private-sector group about to deliver what it has promised. And let's hope that its findings will be heeded, with benefits for our air quality as strong as those MSRC represents for our marine environment.



# Making sense out of nonsense

Some self-proclaimed clean-air "experts" have been saying for years that if cars ran on alcohol instead of gasoline, we would all breathe easier. Make sense? Not from a scientific standpoint.

Recent research findings are raising new doubts among scientists and, if America's lucky, among lawmakers, too.

Champions of wood alcohol, or methanol, have touted it as the fuel of choice for reducing vehicle emissions and smog-producing ozone. When preliminary methanol studies of some years ago yielded mixed environmental results, high cost projections and concerns about high toxicity, this fuel's star lost some luster. Still, advocates decided it deserved a more thorough review.

Now it has gotten it. Methanol is among the alternative fuels being studied by the Auto/Oil Air Quality Improvement Research Program (AQIRP), the most comprehensive clean-air research program ever conducted that considers vehicles and the fuels they use as a total system.

After two years of testing, AQIRP recently released its findings on the contribution to ozone formation of cars and light-duty trucks powered by "M85," a mixture of 85-percent methanol and 15-percent gasoline. (Gasoline is added to methanol to help it cold-start cars and, for human safety, to give it a visible flame when it burns.) The study weighed various fuel formulas, vehicles, test-model cities and pollutants in myriad combinations.

The results were mixed, but one key finding was startling: By the year 2010, M85 used in the study's prototype vehicles, designed to run on methanol or gasoline, could contribute 26 percent *more* to ozone in smog-plagued Los Angeles than today's gasoline in today's gasoline vehicles would. From previous AQIRP studies, we had indications that by 2010, gasoline vehicles powered by the best reformulated gasoline tested by the researchers to date would contribute 26 per-

cent *less* to L.A. ozone than today's gasolines would. Put the two results together, and that's a whopping 52-percent ozone swing between gasoline and methanol, and it's given the researchers pause.

Researchers were also given pause on the economic side. An AQIRP-contracted study found that, in the mid-1990s, the cost to motorists of M85 would be the equivalent of 74 cents a gallon higher than the cost of gasoline. And that doesn't take into account the transition costs of retooling or replacing refinery hardware, pipelines and service stations—costs that eventually would have to be borne by motorists.

While these methanol findings are less than glowing, this is hardly the last word on the subject. Methanol-prototype vehicles are likely to improve; gasoline vehicles and fuels will continue to improve, too. Research will keep pace with all these improvements to see if different emissions findings emerge.

What we know for sure at the moment is this: There's no conclusive basis yet for authorizing any one fuel type over another. And wisely, our legislators and regulators haven't rushed to premature mandates for methanol.

We're hopeful that our lawmakers will let science guide their future clean-air decisions. Otherwise, we could wind up with costlier fuels, costlier cars and no less smog than we had before.

*Three U.S. automakers and 14 oil companies, including Mobil, launched the Auto/Oil Air Quality Improvement Research Program in 1989. It's a \$40-million effort to provide legislators and regulators with the data they need to help meet the nation's clean-air goals. At AQIRP's invitation, federal and state agencies reviewed the research plans from the start. Test data are readily available to all interested parties, and the Environmental Protection Agency and the California Air Resources Board are among the regular recipients.*



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# Environment or politics?

This is a story about pressure.

In enacting the 1990 Clean Air Act, Congress laid out a set of requirements for reformulated gasoline. One of these had to do with limiting the emissions of smog-producing Volatile Organic Compounds (VOCs).

In an effort to determine how best to meet the Congressional requirement, a team of industrial, environmental and governmental negotiators sat down together to find a workable regulatory solution. Included were people from the Environmental Protection Agency, the oil industry, the automotive industry, environmental groups and the ethanol industry. The negotiators accomplished their task, and determined that one of the ways to help control the smog-producing VOCs would be to place limits on the evaporation rate of fuel.

Well, they thought they had accomplished what they set out to do. But when ethanol couldn't meet the negotiated requirements, the ethanol industry started looking for special treatment and began putting on the political pressure.

First, the ethanol industry tried negotiating with the Bush Administration to have all other fuel manufacturers change their formulations in order to accommodate ethanol in the total product mix. Having failed in that regard, they then sought from the Environmental Protection Agency a waiver applied to ethanol blends of reformulated gasoline. But the problems in granting such a waiver were also insurmountable, as demonstrated by the opposition of nearly 100 Senators and Representatives who wrote to President Clinton stating the proposed waiver would undermine provisions of the Clean Air Act.

But the ethanol lobby, not willing to give up with only two strikes against them, decided to take another swing. Recent press reports indicate that the Clinton Administration is now under pressure from some Midwest legislators to issue an executive order that mandates the use of ethanol in reformulated gasoline because it is a "renewable" additive.

That should be strike three—particularly if you examine the facts.

So, let's set the record straight.

First, mandating ethanol usage is not good environmental policy. The disingenuous labeling of ethanol as a "renewable" fuel resource is little more than pork barrel politics masquerading as environmental awareness. For example, diesel fuel is consumed in the process of planting, fertilizing and harvesting the corn from which ethanol is made. Additional diesel fuel and gasoline supplies are used to transport the crop to the ethanol refinery. Finally, natural gas and coal provide in whole or in part the energy to operate the ethanol refinery.

Considering all the nonrenewable energy expended for ethanol production using current technology, characterizing ethanol as "renewable" is like calling the operation a success even though the patient dies.

Second, ethanol doesn't make sense economically. Ethanol blends like gasohol are much more costly to produce than gasoline without ethanol. The only thing that has helped them to compete is a substantial subsidy—at taxpayers' expense—of 54 cents a gallon of ethanol at the federal level. And an average of about 20 cents a gallon is added in some states. With Congress and the Administration enacting new taxes on the rest of America, the ethanol subsidy seems badly out of step with the national will. It's a half-billion-dollar-a-year subsidy the nation's taxpayers should not have to pay. How does that make economic sense?

Finally, making exceptions or granting special "credits" for ethanol simply isn't good energy policy. If we as a nation have learned anything from government interference in the energy marketplace during the 1970s, it should be that special exemptions, waivers and mandates simply do not work. In a nation that thrives on competition, the rules of the game should apply equally.

No matter what kind of face you put on it, granting special treatment for ethanol would simply be politics as usual—a concept that has never been good for the country as a whole.



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**A call for change**

# When the goal is clean air

We are a nation of dreamers and doers with a history steeped in technological accomplishments. It's a combination that has worked well for us. At the same time, however, we have to be careful that our past successes in some areas don't blind us to the realities of what we can expect to accomplish in others.

A case in point has to do with simplistic solutions to the clean air problem—like the electric car, for example. There's no doubt every avenue should be explored, every road tried. But if we as a nation start to think the electric car today is a viable highway to clean air, we are in for a sad awakening.

For one thing, electric cars are not pollution-free. Both the manufacture of electricity and production of the required batteries involve certain amounts of emissions and other pollution, some of which can be quite burdensome. For another, electric cars are expected to be significantly more expensive than conventional automobiles. What's more, their performance is severely limited. So, until new technology is forthcoming and the cost of electric cars can be substantially reduced, and until their range is dramatically improved, there will be many better, more cost-effective ways to improve air quality.

This is not meant to knock any particular solution but to refocus the debate to the real issue: clean air. Nobody should have a problem with that. The question is how to attain that end in the most cost-effective manner.

For the moment and, it would appear, well into the next century, the best way to get to cleaner air in the transportation sector is to rely on results from the 1990 Clean Air Act. Regulations from this law have already brought changes to fuels that are reducing pollution now. Additional changes to further reduce emissions from vehicles and fuels are close behind.

Alternative fuels, such as methanol and ethanol, have their own problems with regard to environmental concerns. They are not cost-competitive with gasoline and not likely to be in

the near future. However, they still need to be considered and Mobil, in fact, is test-marketing alternate fuels in various parts of the country. But attempts to mandate specific fuels and/or vehicles would hardly be a proper approach to a clean air solution.

Over the last two decades, with the regulators setting standards and the auto and petroleum industries devising ways to meet them, automotive emissions have declined steadily—even spectacularly—showing reductions per gallon, per mile and per car. Improvements will continue as older cars, which produce the most pollution, are replaced with newer, cleaner burning cars.

Clean Air Act amendments enacted in 1990 will further reduce vehicle emissions from both the cars and the fuel. Oxygenated fuel, which is being sold at some additional cost in mandated areas of the country this winter, is one of these changes. Cleaner burning diesel fuel will be introduced nationwide later this year. Further vehicle emission reductions will kick in next year, cleaner burning (reformulated) gasoline in 1995, additional reductions from gasoline emissions in 2000, and possible additional vehicle reductions in 2003. During this period, the contribution of the auto to air pollution, which has been getting smaller and smaller, will become very small, indeed.

In short, present fuels, reformulated for environmental purposes, are reducing pollution now, and more will be done later through programs already under way. Compared with alternative fuels, reformulated gasoline will for some time remain the lowest cost vehicle fuel. Increased government spending to subsidize the manufacture of alternate fuels at taxpayers' expense will only distort true costs and raise the cost of energy for consumers and businesses across the country. The nation is struggling to come out of a recession and striving to compete in a highly competitive global economy. Raising energy costs needlessly is hardly the way to clear the air.



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# 33/50: An experiment that works

In early 1991, the Environmental Protection Agency (EPA) decided to test a new way of doing business. It was an experiment to see if voluntary efforts by industry could achieve pollution-reduction goals faster than regulation. In the space of just two years, industry proved it works, and the nation's air is becoming cleaner in the process.

Called 33/50, EPA's initiative targeted 17 priority toxic chemicals, such as benzene and xylenes. The goal was to get participating companies to reduce emission of these chemicals 33 percent by 1992 and 50 percent by 1995. The reductions are measured against Toxics Release Inventory data reported by industry, with 1988 as the baseline.

According to EPA, the 33/50 Program has made rapid and impressive progress:

- Chemical emissions have declined by nearly 600 million pounds or 40 percent between 1988 and 1992, surpassing the 33 percent goal by over 100 million pounds.
- EPA's projections indicate the program's ultimate target of a 50 percent reduction could be met nearly two years ahead of schedule.

Voluntary efforts work, and the spirit of these initiatives is infectious. When Mobil signed on to 33/50 in 1991, we were one of 230 companies. More than 1,200 companies participate today.

Mobil was among a select group of companies participating in 33/50 to be recognized by the EPA for making substantial reductions in emissions (a million pounds or more) or especially rapid reductions (virtually 100 percent). By year-end 1992, our five U.S. refineries and a number of our chemical manufacturing facilities had cut emissions 2.5 million pounds from our 1988 baseline.

Protecting the environment is a responsibility we take very seriously. We recognized the

need for it in 1956, when we formulated a formal environmental policy, 14 years before EPA was created. And the resources—people, capital investment and technology—we dedicate to this charge have grown over the years. For three years in a row, our spending has topped \$1 billion.

Experience has taught us that voluntary efforts rather than the command-and-control regulatory process are often the best way to continuously improve environmental performance.

Which is one reason Mobil applauds and supports the federal government's voluntary approach to reducing greenhouse gases through its Climate Change Action Plan. Included in the plan are nearly 50 initiatives that foster cooperative approaches to improving environmental performance. We already participate in several of these programs and are evaluating others. We've signed on for:

- **Green Lights.** This EPA program encourages U.S. businesses, governments and institutions to switch to energy-efficient lighting and save money doing it. Mobil's efforts earned us EPA's first "Partner of the Year" award in 1994.

- **WasteWi\$e.** This program complements existing business waste-reduction efforts and also helps companies get off to a fast start. As a charter member, Mobil has committed to a number of waste-prevention and recycling goals.

- **Energy Star.** This EPA/Department of Energy initiative encourages use of more efficient technologies to reduce energy usage in commercial buildings. Several Mobil facilities worked with EPA to evaluate the viability of several energy-efficiency technologies.

We're encouraged by these cooperative efforts. So's the government. An experiment like 33/50 shows that American business can pass the test with flying colors.

**Mobil®**

**Clearing the air**

# Who's in the driver's seat?

Congress passed the original Clean Air Act in 1967 after it had become clear that the nation's air quality was deteriorating. Since then, there have been three major sets of amendments, each providing broader, stronger and more comprehensive legislation. Most recently, the 1990 Clean Air Act Amendments set the course for many current and soon-to-be-introduced environmental improvements.

Mobil opposed some of that legislation, because we thought it might be too costly for the consumer. In retrospect, we were wrong. Air quality is improving, at a cost acceptable to the motoring public.

New-car tailpipe hydrocarbon emissions that contribute to smog, for example, have been reduced about 95 percent between 1965 and today. That happened because the federal government established the standards, U.S. industry developed efficient means to meet the standards, and the American people were willing to bear higher cost.

Automobiles, of course, are not the only sources of pollution, but the U.S. is at a crossroads right now when it comes to cars and air quality.

The 1990 Amendments called for changes in fuels as well as vehicle technology, and those changes are being phased in now. In addition, this year, the environmental agency of each state must submit an implementation plan to the federal Environmental Protection Agency specifying how overall goals will be met. Some states are considering "trip reduction" measures, which would mandate carpooling.

Others would require that automakers sell a certain number of costly electric cars. Some states would mandate specific fuels rather than letting emissions standards do the job.

In short, it's beginning to look like the inmates are out of their cells and in charge of the asylum. What Congress started in 1990 with the Clean Air Act Amendments is now running under its own steam and in a variety of different directions. And unelected state environmental officials are making policy decisions that could have a sweeping effect on unwary motorists. Those decisions are subject only to approval by other unelected environmental officials at the federal level.

It seems to be time for the public to become more aware of the process and to get more involved in searching for the answers needed from today's perspective: Which are the best, most cost-effective approaches to cleaner air?

In the hopes of stimulating a dialogue, in the weeks ahead we'll be outlining some of the substantial gains the nation has made so far and what still remains to be done. We'll also take a look at the effectiveness of the various alternatives. Let's face it. We all want cleaner air. That's not what the debate is about. There are just different ways to get there. We'll try to separate rhetoric from the real stuff and, we hope, provide enough information for Americans to make up their own minds as to which routes to take. Then they can make their views known to government officials.

**Next: The roads already traveled.**

**Mobil®**

**The environment...better than you think**

# **The sky is not falling**

Good news: The end of the Earth as we know it is not imminent. The cycle of decline in the quality of our environment can be broken and, despite what some environmentalists are claiming, great strides have already been taken towards improving our situation.

We are not saying the world is a pristine place without problems. Nor are we diminishing the role that environmentalists played in calling attention to the importance of protecting the planet. In fact, it's probably because they painted such alarming pictures that individuals and industry took steps to lessen man's impact on the environment.

But more than 30 years have passed since the environmental movement began. They made their point. There is no longer a need for alarmists; but there is a need for some perspective and some optimism. There's a lot of good news out there.

Gregg Easterbrook has given us that perspective in his recent book, "A Moment on the Earth: The Coming Age of Environmental Optimism" (Viking Penguin, 1995). Easterbrook talks about the dire predictions of the 1960s and 1970s that did not come to pass, sheds light on the tenacity of the Earth and discusses how much good has already occurred, while not diminishing the work that remains to be done.

The robin, which some believed would be extinct by now, is still one of the most prolific birds in the United States. The 1980s saw not widespread starvation as some had forecast, but an agricultural abundance. The supply of petroleum that some said would be exhausted by the 1990s is still ample.

As Easterbrook points out, air in the U.S. is significantly cleaner in the '90s than it was in the '70s. Smog in the U.S. declined even as the economy grew and the number of cars on

the road increased. Air pollution from lead declined by more than 90 percent, and emissions that form smog and acid rain declined substantially. The number of cities that do not meet national ambient air-quality standards has declined by 50 percent since the mid-'70s. This is progress.

And to those who think industry and nature cannot coexist, we say show a little respect for Mother Nature. She is one strong lady, resilient and capable of rejuvenation. The environment recovers well from both natural and man-made disasters.

When Mount St. Helens erupted in 1980, it destroyed 200 square miles of land and 19 million old-growth trees. Just 15 years later, much of the area has recovered. New generations of elk have learned to feed in new-growth forests rather than old growth. Coho salmon, thought unable to survive in the now unnaturally warm waters of the area, are thriving. Even Alaska's Prince William Sound survived a 1989 oil spill and today is biologically alive thanks to the remarkable powers of nature.

In his book, Easterbrook points out nature itself has produced far more devastating changes than any caused by man—ice ages, meteor strikes, large-scale volcanic eruptions that spewed millions of tons of "pollutants" into the air—and the environment has survived.

Does this justify or lessen the impact of industrial pollution? Of course not. Our point is that nature, over the millennia, has learned to cope. Mother Nature is pretty successful in taking on human nature.

There are plenty of legitimate environmental problems yet to be tackled. But they won't be solved by crying that the end is near or by diminishing the accomplishments we have already achieved.



# A policy agenda for tomorrow



In the weeks since the elections, there's been much talk by both political parties on the need for cooperation, compromise and consensus. We applaud this spirit and look forward to the fruits of it as the administration and Congress begin to deal with a number of significant issues in the coming months.

As a global company with deep American roots, we have a vital interest in policies that affect our nation's economic health and global influence. And as an employer, we care about decisions that will impinge on our people. Here, in brief, is a policy framework that, we believe, will help prepare the U.S. to move confidently into the 21st century.

**Entitlement programs.** The looming financial problems with Medicare and the longer-term demographic pressures on the Social Security program need to be addressed. Steps taken sooner will be less painful than those we must take if we wait until fiscal disaster raps at the door.

**Trade.** U.S. economic prosperity is tied to our participation in the global economy. When the U.S. imposes unilateral trade sanctions on other nations, it puts American companies at a disadvantage against overseas competitors. Such sanctions are ineffective and cause others to question the reliability of both America and its companies. In the long run, the U.S. economy and domestic jobs suffer. Secondary boycotts offend the sovereignty of our economic allies and can provoke reprisals against U.S. commercial interests abroad.

**Environment.** Concern over global climate change is triggering actions that could cause severe dislocations throughout the world economy. To reduce greenhouse-gas emissions in developed countries, governments are considering binding targets, timetables and common mea-

sures. We believe participation by all nations—both developed and developing—is imperative. Constructive steps—improved energy efficiency, conservation and fuel switching—are already under way. Economic analysis of the various emission proposals should be factored into development of sound policy. Better science and flexible timing also need to be part of the mix.

**Regulations.** America needs a balanced approach to regulations. They should be based on sound scientific data with costs measured against the desired benefits. Quite simply, we should avoid rules that require wasteful spending for diminishing returns. On the other hand, we shouldn't tamper with rules—like national air quality standards—that are working.

**Tax policy.** The fundamentals of a good tax system are simplicity, fairness, economic efficiency and stability. When these principles are overlooked, as they are in parts of the U.S. tax code, business and citizens are penalized. At the same time, tax rules shouldn't place U.S. companies at a competitive disadvantage vis-à-vis their international colleagues.

**Education.** Our business success is directly linked to the skills and knowledge of our employees. We look to our nation's schools and universities to produce competent workers. The public and private sectors should collaborate to improve the skills of American workers. Parents and taxpayers should demand high standards and cost-effective performance from their schools. Business should work with educators to identify the skills tomorrow's workers will need.

These are tough issues which we hope can be addressed productively. Let's not lose sight of the goal: preparing our nation to move confidently into the next century.

In the coming months, we intend to address these issues in greater depth.

**Mobil** The energy  
to make a difference.

# Electric cars: still a bumpy ride

 Electric cars are beginning to appear in showrooms in Southern California. Their arrival has been eagerly anticipated by those seeking to reduce smog. Much government attention has focused on attempting to create an alternative to gasoline-powered autos, including even mandates for electric vehicles in some states. Subsidies and tax credits may prompt some upscale customers to take an electric car for a spin. And the automotive industry has been working on ways to improve these cars' performance. On balance, though, electric vehicles (EVs) still have some big bumps to overcome.

The goal of a cleaner environment is one that we all share. Before embracing EVs as the panacea, we need to examine the trade-offs we're getting in the name of cleaner air. Consider the following:

■ The batteries used in most of today's electric cars are lead-acid, just like those used in today's gasoline-powered vehicles. Researchers at Carnegie Mellon University and the Georgia Institute of Technology have found that putting large numbers of electric cars on the road could put significant amounts of lead back into the environment. The introduction of 500,000 electric cars in either Southern California or New York City would only reduce smog there by **less than 1 percent** while increasing national environmental lead discharges by some 20 percent.

■ What proponents of EVs tend to overlook is the total energy/emission package. While EVs may not create tailpipe emissions, the electricity needed to charge and recharge the batteries has to come from somewhere. More than two-thirds of the nation's electricity is generated from plants that burn fossil fuels, mostly coal. Several years ago, the U.S. General Accounting Office concluded, among other things, that the environmental benefits of EVs are dubious.

■ The price and performance of these cars remain significant hurdles. Many of the new EVs will be leased, not sold, reportedly so owners won't have to worry about "batteries dying prematurely [or] the resale value sinking very low." They will have a driving range of 70 to 90 miles between recharges, which can take at least three hours, and monthly lease payments could range from \$480 to \$640.

■ Real progress has been made in reducing pollution from gasoline-powered vehicles. The clean air edge that EVs promised has evaporated as gasoline-powered autos have cleaned up their emissions dramatically. Today's cars burning today's gasoline produce 96 percent fewer tailpipe emissions than those of a generation ago. And future cars are likely to have even lower emissions.

■ Prescribing new auto habits doesn't come cheaply. Most taxpayers are unaware that they are being tapped to subsidize this new transportation mode. The burden of leasing an EV in California, for example, will be eased by hefty tax credits (reportedly more than \$5,000) available from federal government and local agencies.

All the evidence—particularly the environmental trade-offs—suggests that lawmakers reconsider the electric car mandate. And they appear to be doing just that. Earlier this year, the California Air Resources Board withdrew its EV mandates for 1998 and 2001. Massachusetts has recently scaled back its mandate on electric cars for 1998 and 2001. Only New York requires the sale of EVs for 1998 and 2001. Longer term, all three states may want to reconsider mandates in place for the year 2003 when 10 percent of all vehicles must be zero-emission.

In the end, consumers and legislators should ask if mandated electric vehicles are solving a problem or if, in fact, they are contributing to a problem.

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# Less heat, more light on climate change

No longer just talking about the weather, many governments are grappling with the possibility that human activities are enhancing nature's greenhouse effect, which might trigger significant changes in the global climate. Under the United Nations Framework Convention on Climate Change, countries are pressing for the stabilization, and eventual reduction, of man-made greenhouse-gas emissions. Nations are gathered this month in Geneva for the Second Conference of Parties meeting. Negotiations will culminate late next year and could result in legally binding targets, timetables and common measures to reduce greenhouse-gas emissions. These deliberations are occurring in an environment where policy and politics may well outrun science and common sense.

As a major energy company, Mobil clearly has a stake in the outcome of these discussions. Fundamentally, though, the impact that some measures could have on jobs and livelihoods will impose extensive burdens on the global community. We are presenting this editorial series in the hope that it will help contribute to a rational and productive discussion on global climate change.

The greenhouse effect is a natural phenomenon. Sunlight passes through the atmosphere and warms Earth's surface. Radiant heat is emitted back to the atmosphere; some of it is absorbed by greenhouse gases—water vapor, carbon dioxide (CO<sub>2</sub>) and methane—and reemitted back to Earth, causing further warming. This heat trapping is known as the greenhouse effect—an occurrence that makes our planet habitable. Naturally occurring greenhouse gases—predominantly water vapor—account for 95 to 97 percent of the current effect. The other 3 to 5 percent is attributable to man's activities. Although CO<sub>2</sub> is the predominant emissions contributor, methane, in the short term, has 25 times

the effect of CO<sub>2</sub>.

Worldwide, the burning of fossil fuels coupled with massive deforestation yields some 20 billion metric tons of CO<sub>2</sub> annually. About half these emissions wind up in the atmosphere. The rest is believed to be absorbed by increased plant growth and the oceans. We know little about this nonatmospheric absorption, which complicates decision-making. For example, how might plant growth and absorption by the ocean change with higher global temperatures? Moreover, greenhouse-gas emissions, which have a warming effect, are offset by another combustion product—particulates—which leads to cooling.

One thing we do know is that greenhouse gases reside in the atmosphere for long periods of time and are dispersed over the entire globe. That means their potential impact on climate should be viewed cumulatively rather than on the output from any one country or in any one year. The concentration of greenhouse gases is building up slowly—less than 0.5 percent annually for CO<sub>2</sub>—and that gives us time to implement effective mitigation measures.

The industrialized countries and the developing world contribute about equally to present-day CO<sub>2</sub> emissions, but the pattern is shifting rapidly, as the peoples of Africa, Asia and Latin America seek to better their lives. The developing nations argue that the industrialized world has no right to impose its environmental rules on them, possibly short-circuiting their industrial revolution, without compensation or dispensations.

This raises thorny social and economic issues. A number of the scientists believe we have the time and the resources to avert a crisis. Policy makers would be wise to amend the maxim, "think globally, act locally," and put the emphasis on *global* action.

**Next:...what we don't know can hurt us.**

The Mobil logo, consisting of the word "Mobil" in a bold, italicized, lowercase font, followed by a registered trademark symbol (®).

# With climate change, what we don't know can hurt us

It has been said climate is what we expect; weather is what we get. Weather is capricious and chaotic. By contrast, climate in the 10,000 years since the last Ice Age has been assumed to be quite stable and serene, an assumption that is crumbling in the face of ever more sophisticated measurements. It now appears that the climate in this period has actually been quite volatile, changing Earth in ways that may dwarf the impact of human activity and complicate predicting climate trends. Nevertheless, the human factor in global climate change and the chance that we might be headed for damaging social and economic dislocations cannot be ignored. In the second of three reports on global climate change, we look at efforts to achieve an ecological balance.

The evolving science of climate change and the known behavior of greenhouse gases in the atmosphere—their long life and global, cumulative buildup—argue for a careful and comprehensive approach to their control. Unfortunately, policy decisions now being considered in United Nations climate change negotiations could lead to premature, inequitable and ultimately counterproductive measures. At stake are trillions of dollars in technological and industrial changes, potentially disruptive trade wars and an unprecedented transfer of wealth.

A critical factor is timing. The compressed timetable of these negotiations tends to create an unwarranted sense of crisis. A gradual approach—one that would not result in an appreciable buildup of gases over the next 100 years—would allow us to improve our understanding of the potential threat and to develop more efficient technology to deal with it. The U.N. Framework Convention on Climate Change itself recognizes the dynamic nature of greenhouse-gas decision-making. It requires periodic review “in light of the best available scientific information on climate change and its impacts, as well as relevant tech-

nical, social and economic information.”

There is great pressure to assign responsibility for the stabilization and reduction of emissions, along with the cost, almost entirely to the industrialized world. While the developing world would be spared the initial burden, such selective controls would penalize all nations in the long run.

Imposing controls only on the industrialized world would likely cause what economists call “carbon leakage”—the transfer of energy-intensive industries to less-regulated countries, where they would offset the benefits of emission reductions. Beyond this, the cost of mitigation, even for the wealthiest nations, would weaken their purchasing power and lead to a reduction in imports from the developing countries—depriving them of a powerful impetus for growth and prosperity.

The U.N. climate control negotiations rely on an arbitrary classification of countries as either developed or emerging. While much of the world falls short of a decent standard of living—nearly 2 billion people have never seen a light bulb, and half of them rely on wood or other biomass for fuel—the developing world as now defined includes a growing list of commercial powerhouses. Among developed countries, patterns of energy use are so diverse that an equal percentage reduction in emissions by all would be both unfair and uneconomical.

Independent studies—by the Australian Department of Foreign Affairs and Trade as well as the Massachusetts Institute of Technology (MIT)—increasingly point to international cooperation and worldwide implementation of control measures as sensible and cost-effective. Such an approach would include funding and technology for emission controls to flow from developed countries to the rest of the world, in return for credits for their own mitigation measures. A cooperative, international approach, we believe, offers a win-win for all nations.

*Next:...we're all in this together.*

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# The Kyoto conference



Barely a week has passed since Argentina's Raul Estrada-Oyuela gavelled a consensus from the delegates in Kyoto, Japan. As details of the agreement unfold, we urge the Administration to discuss what it means for the U.S.

What the U.S. sought going into Kyoto appears to have little resemblance to what finally emerged. The treaty, which seemingly disregards the Senate's caveats, doesn't seem promising for our nation. A scorecard, we believe, would show America came out on the short side.

■ What specifically will the economic impact of the emission targets and timetables have on the U.S. economy?

■ What about jobs? Can the Administration say that such measures will have no impact on people's jobs?

■ What about lifestyles? Can our nation agree to such drastic actions without changing the way people live and move about?

■ Without the full participation of all countries, what environmental benefit can the Administration promise to the American people who will be directly affected by this treaty?

■ Originally, the U.S. sought no reduction in emissions levels; the goal was to stabilize carbon emissions at 1990 levels. Why did it abandon that goal and agree to a seven percent reduction from the 1990 base? Since U.S. emissions have climbed by nine percent through 1996, how will the nation reach this new goal without sharply cutting energy consumption and closing the door on economic growth? People need to know what they will be asked to do to get from here to there without it affecting their jobs, lifestyles and future

prosperity. Can these cuts be gotten without resorting to a carbon tax or some form of energy rationing?

■ Why has the U.S. been unable to persuade developing countries to even consider voluntary efforts to reduce emissions? By early next century, their emissions will surpass those of the industrialized world. Can a treaty that fails to include these nations, in fact, help reduce global emissions?

■ The principles of emission trading and joint implementation were acknowledged in the final agreement. The devil, though, is in the details. How will a trading scheme that includes multiple gases and many sources of emissions, and spans international borders, be worked out?

■ Related to emission trading, since Russia and the Ukraine will be substantially below their emission targets, they can sell their emission credits. Are Americans willing to underwrite the transfer of billions of dollars to these nations so the U.S. can reach its emission targets?

Despite strong reservations about this treaty, Mobil recognizes the legitimate concerns over the potential for global warming. That's why we have taken steps to reduce our own emissions and initiate reforestation programs. We're also funding research programs to improve our scientific knowledge of climate change and to increase R&D on cleaner-emission technologies.

While the focus of Kyoto was climate change, the most heated discussions centered on sharing the economic burden of reducing emissions. That's the kind of discussion the Administration needs to bring forward in the coming months.

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# Climate change: a degree of uncertainty



The debate on climate change has been long, complex and intense. Governments, corporations, scientists, economists and private citizens have all helped to frame this debate. Today, we respectfully submit our message to the officials who are gathered in Kyoto to consider actions to reduce emissions of carbon dioxide and other greenhouse gases.

Mobil shares the widespread concern about the potential impact of these emissions on the global climate. At the same time, we are concerned that mandated emission cutbacks now will produce grave economic consequences for all nations.

Fossil fuels dominate the world's energy picture today. For at least several decades, they will continue to be the major source of the world's energy needs. Government and the private sector should begin now to expand the array of technology options that can help reduce our emission of greenhouse gases in the future.

The mission of the delegates at the Kyoto conference should not be driven by the politics of an artificial deadline, nor should it be constrained by only the several proposals under consideration.

Two factors argue for nations to move prudently. First, there is a high degree of uncertainty over the timing and magnitude of the potential impacts that man-made emissions of greenhouse gases have on climate. Second, the emission-reduction policies being considered carry with them very large economic risks. Objectives and actions to deal with climate change can only be determined as additional knowledge is gained and uncertainties minimized. Nations should commit themselves to meaningful actions, including:

- Governments should encourage and accelerate cooperative research on climate change while harnessing free markets and voluntary measures to deliver optimum emission reductions while preserving sustained economic growth.
- To address the scientific uncertainty, governments, universities and industry should form global research partnerships to fill in the knowledge gap, with the goal of achieving a consensus view on critical issues within a defined time frame.
- During the fact-finding period, governments should encourage and promote voluntary actions by industry and citizens that reduce emissions and use energy wisely. Governments can do much to raise public awareness of the importance of energy conservation.

Mobil is already participating in such efforts. Through cooperative endeavors, we are funding research on technologies that promise greater energy savings or lower greenhouse gas emissions. We are continuing to create energy-saving products, reducing our own emissions and undertaking forestation projects to remove carbon dioxide from the atmosphere.

In proposing these recommendations, we ask the Kyoto delegates to avoid mandates based on uncertain science and to resist agreements that could inflict great economic pain. Take steps to curtail emissions, develop more energy-efficient technologies and improve scientific understanding: These are the challenges nations should lay before their citizens. Collectively, we can accomplish a lot.

The Kyoto delegates should know that there is time to make it right. Advances in climate science can remove a degree of uncertainty from decisions on how best to protect our planet and its inhabitants.

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# The Senate speaks



Once a distant blip on the radar screen, the issue of climate change is getting a great deal of media and political attention. And that's fine as long as such attention doesn't stampede nations into adopting unwise and disruptive quick fixes.

Assessing the potential dangers from the buildup of greenhouse gases (mainly carbon dioxide and methane) and developing an action plan to combat emissions in an equitable manner has produced serious disagreement among scientists, economists and climate change negotiators for the past five years.

The issue seems headed for a showdown this December in Kyoto, Japan, as industrialized nations negotiate a reduction in greenhouse gas emissions. A number of plans have been tabled —each with varying economic costs.

While industrialized nations are divided on the sacrifices each is willing to assume, the drive for action is running strong. In June, President Clinton promised to bring to the Kyoto conference "...a strong American commitment to realistic and binding limits...[to] reduce emissions of greenhouse gases."

That commitment, though, must be balanced against the concerns expressed in a Senate resolution on the terms under which the U.S. should sign an agreement on greenhouse gas emissions.

The Senate, in discharging its constitutional authority, must ratify any binding agreement or treaty. Exercising its oversight responsibility, the Senate frequently expresses its views to the administration long before final negotiations begin. Which is why the recent vote on Senate Resolution 98 deserves more

than passing comment.

Introduced by Senator Byrd of West Virginia and cosponsored by 64 senators, both Democrat and Republican, Senate Resolution 98 passed by a 95 to 0 vote. It signals genuine concern about ratifying a treaty that doesn't involve participation by all nations or could jeopardize the U.S. economy. Mobil has expressed similar concerns in this space during the past year.

Here is what the resolution cautions about any agreement emerging from Kyoto:

*"(1) the United States should not be a signatory to any protocol which...would—*

*"(A) mandate new commitments to limit or reduce greenhouse gas emissions [for the industrialized nations] unless the protocol ... also mandates new specific scheduled commitments to limit or reduce greenhouse gas emissions for Developing Country parties....*

*"(B) result in serious harm to the economy or the United States; and*

*"(2) any such protocol...should be accompanied by a detailed explanation of any legislation or regulatory actions that may be required to implement the protocol...and should also be accompanied by an analysis of the detailed financial costs and other impacts on the economy of the United States...."*

When the Congress speaks this forcefully, the American public as well as the administration should take notice. The issue of climate change will loom large in the coming months. We urge each and every citizen to study the issue, engage in the debate and express your opinion. No one ever said making democracy work is easy.

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# Climate change: Let's get it right



As world leaders gather at the United Nations to review our planet's progress on sustainable development, we expect they also will caucus on the issue of climate change. The reason: In just six months in Kyoto, Japan, nations are poised to settle on a plan to reduce greenhouse gases.

It began five years ago in Rio de Janeiro, when nations agreed to formulate a plan to reduce greenhouse gases. The concern is that the buildup of these gases (carbon dioxide, methane and nitrous oxide) in the atmosphere could cause climate change.

The agreement that will likely emerge from the Kyoto meeting will commit only industrialized nations to binding targets and timetables to control their emissions of greenhouse gases; other nations may be asked to participate in this process, but they are not bound to action. Emission abatement plans have focused primarily on CO<sub>2</sub>, which is produced when coal, oil and natural gas are burned. Much is at stake in these upcoming global climate discussions—not just a habitable planet for future generations, but also a world where all nations can provide for the economic well-being of their citizens.

We encourage governments to take the time to do it right—to examine the science, decide if emission levels are dangerous and then evaluate steps to effectively mitigate or reduce future emissions. If the wrong decision is made, it could be divisive—pitting industrialized countries against developing nations—and derail the serious effort that may be needed to stabilize emission levels.

A number of emission proposals have been tabled. They deserve the attention of all government actors—not only environmental ministers, but also the economic and finance ministers. Abatement measures need to be flexible so nations can benefit from new technology and improved understanding of the science and economics of climate change.

Instead of rigid targets and timetables, governments should consider alternatives, including:

- Adopt consensus objectives; encourage voluntary initiatives and government-industry partnerships that will help attain these goals.

- Target all greenhouse gases, not just CO<sub>2</sub>; encourage development of sinks—activities that offset or reduce these gases—like reforestation and improved agricultural practices.

- Encourage development and dispersion of new technology to assure widespread adoption of cost-effective abatement approaches.

While the likely Kyoto agreement will directly affect only industrialized nations, the burden will ultimately be borne by others. Many studies point out that in a world where economies are increasingly integrated, energy exporters and developing nations will suffer as well. As industrial economies are driven to switch fuels and revamp their industrial bases, their growth will falter, altering trade patterns throughout the world.

A draft U.S. Department of Energy study on six energy-intensive industries indicates that high energy prices, which would follow from stiff commitments to reduce CO<sub>2</sub> emissions, would have a crushing effect on these sectors. And despite the blow to U.S. jobs and this industrial base, it is unlikely that overall emissions would be reduced because the manufacturing capacity would migrate to countries not bound by emission limits.

Congress is also concerned. Sixty-one U.S. senators are calling for further review of the climate change issue. Since a binding agreement signed by the U.S. will require Senate ratification, many legislators believe any emission reduction plan should include an estimate of its economic impact.

Clearly, curbing greenhouse gases is the responsibility of all nations. By early next century, fast-growing, developing nations will be the largest carbon emitters. That's why it is incumbent on all nations to participate in the solution even in the short term.

As officials head home, we urge them to reflect on the decisions that they will enter into later this year. The world is counting on wise and prudent action.

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**Global Climate Change**

# Stop, look and listen before we leap



International efforts to deal with climate change are lurching from speculation toward actions that could wreak havoc on nations even as the underlying science and economics continue to signal caution.

While governments have agreed that there may be reasons for concern over the buildup of greenhouse-gas emissions, primarily carbon dioxide (CO<sub>2</sub>), there is no consensus on what constitutes "dangerous levels" of emissions nor is there agreement on when, where and how best to reduce their impact. Yet, an action plan with binding commitments on developed nations could take shape by year's end.

We are concerned that policy makers are not considering the implications of controlling CO<sub>2</sub> emissions. Studies have examined some of the emission-control plans tabled to date and concluded that they will impose painful burdens on developed economies, particularly if timetables are short and targets unrealistic. For Americans, such solutions mean jobs will disappear and lifestyles will be pinched as our industrial infrastructure shrinks.

A study just issued by Charles River Associates (CRA) provides additional weight to the impact of emission controls in an age of global markets. The report shows how ill-timed or ill-considered abatement measures could stunt world economic growth, unsettle global trading patterns and set the stage for a new era of trade protectionism.

CRA analyzed two abatement scenarios—one a more modest stabilization proposal, the other a more aggressive reduction plan. Both policies appear to fall within the boundaries of acceptability by the U.S. government. The authors utilized a carbon-rationing plan to achieve required reductions in CO<sub>2</sub> emissions. In

practice, rationing will increase energy prices for both industry and the consumer.

The cost of limiting emissions could range from \$200 to \$580 per ton of carbon, depending on the timing and severity of the plan selected. To put this in perspective, this equates to an additional cost to consumers of 50 cents to \$1.50 per gallon of gasoline in today's dollars.

The expected blow to U.S. prosperity would be considerable, according to CRA: an annual drop in gross domestic product ranging from \$105 billion in the year 2010 to \$460 billion in 2030, both in today's dollars. At the lower range, this works out to a loss in annual household income of roughly \$1,000.

One key finding of CRA's study is that the economic burden of emissions controls is borne not only by the industrialized countries, but also by developing societies, who under current proposals need do nothing. The developed world feels the pain as it is forced to switch fuels and revamp its industrial infrastructure. The developing world, which now exports 60 to 75 percent of its products to industrialized countries, will see those markets shrivel as economic growth stalls and demand for protectionist measures grows. Developing countries that import energy will benefit from lower fossil-fuel prices, but in most cases that gain won't offset the loss of trading markets. And energy exporters—be they developed or developing—will be particularly hard hit as energy markets shrink.

The CRA study injects a healthy dose of realism into the climate-change debate. In the coming months, we'll continue to look at what other experts are saying. Meanwhile, we urge international policy makers not to make 1997 a year of hasty decisions. The entire world's prosperity depends on a course of wise, sustainable action.

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# Climate change: a prudent approach



Ask the wrong questions and you may be stuck with the wrong answers. This could occur next month in Kyoto, Japan, as government negotiators weigh questions on how to reduce greenhouse gas emissions now and who should bear the burden of these cuts.

These questions, we believe, are premature. We don't know enough about the factors that affect global warming and the degree to which—if any—that man-made emissions (namely, carbon dioxide) contribute to increases in Earth's temperature.

Instead, we should be asking: What precautionary, voluntary steps can be taken now to reduce greenhouse gases while science is developing answers that will improve our decision-making?

Governments, industry and individuals can all contribute. Mobil is stepping up efforts on two fronts—reducing emissions at the source and removing carbon dioxide from the atmosphere. We're supporting research and technology efforts, curtailing our own greenhouse gas emissions and helping customers scale back their emissions of carbon dioxide.

**Technology/R&D.** We continue to sponsor research at universities and other institutions. At Battelle Pacific Northwest Laboratory and the Massachusetts Institute of Technology, for example, we're supporting research to identify technology strategies that promise the greatest potential for reducing greenhouse gas emissions.

At Columbia's Lamont-Doherty Geophysical Observatory, we supported work on the role that oceans play in the climate system. Though more than 90 percent of the energy in the climate system is stored in the top layer of the oceans, scientists currently have a poor understanding of how to predict sea surface temperatures. Improved understanding of this system could lead to better predictions of future climate change.

More is on tap for the future. More to understand the greenhouse gas implications of our investment decisions as we develop new hydro-carbon resources. More to investigate technologies that can reduce energy consumption and greenhouse gases. And more to support changes in transportation power sources and fuel technologies, including fuels for hybrid and fuel-cell vehicles.

**Internal efforts.** Inside Mobil, we've cut emissions by more than one million tons of carbon over the past three years. To put this in context, the average U.S. automobile emits about two tons of carbon annually. We've used manufacturing process improvements to cut the energy needed to refine a barrel of oil. Without compromising safety, we've eliminated gas-flaring from many offshore operations. And participating in a U.S. government program, we've eliminated leaks of methane, which is six times more potent than carbon dioxide, from our natural gas production and distribution systems. Upgraded lighting systems and more energy-efficient offices have helped, too.

**Products.** Mobil's synthetic lubricants help customers use energy more efficiently. Use of these products helped cut carbon emissions by one million tons since 1990. For tomorrow, we're designing more stable lubricants that promise longer life and greater energy efficiency.

**Reforestation.** We intend to sponsor several projects to plant and protect trees in the U.S. and internationally. Such activities absorb significant amounts of carbon dioxide and sustain the environment.

And that's just what one company—Mobil—is doing. Working together, government, industry and individuals can achieve major progress in reducing greenhouse gas emissions while scientists work to provide more definitive answers on the impact that these gases and other factors may have on our climate system. Let's wait for more answers before taking on obligations that could jeopardize better living standards for all.

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# Climate change: where we come out



The government representatives who will meet in Kyoto, Japan, have a weighty task. They must consider several proposals for cutting emissions of carbon dioxide and other greenhouse gases, knowing that each carries a large price tag for the global economy.

We share the widespread concern over the possibility that human activity may contribute to global warming, and we have used this platform to participate in the climate change debate. On the eve of the Kyoto conference, we take this opportunity to sum up our position.

Each of the proposals being weighed in Kyoto would require dramatic emissions cuts over the next 10 to 15 years. The most moderate plan calls for nations to stabilize emissions at 1990 levels by the year 2010. Why is that a problem? There is simply no easy way to get back to that level given the current and projected rates of growth in energy demand. Agreeing to mandatory targets will stunt economic growth.

Two questions, we believe, must be asked: Is it necessary? And is there a better way to do it?

As to its necessity, the best answer to date is a resounding "maybe." Even after two decades of progress, climatologists are still uncertain how—or even if—the buildup of man-made greenhouse gases is linked to global warming. It could be at least a decade before climate models will be able to link greenhouse warming unambiguously to human actions. Important answers on the science lie ahead.

Credible economic studies, including those by Charles River Associates and Wharton

Economic Forecasting Associates, point out the enormous, cumulative costs that these proposals could have. Just stabilizing greenhouse gas emissions at 1990 levels and assuming the benefits of ongoing technology will compel industrialized nations to cut their consumption of fossil fuels by nearly 30 percent.

Energy producers and energy-intensive industries will suffer most, but everyone will feel the pinch. Even if developing nations are exempted from emissions cuts (as many nations have proposed), they would also feel the impact, for they would face reduced markets for their goods.

There is a better way—one that doesn't commit nations to targets that may be scientifically overblown and financially crippling. The first steps are already being taken. There is much that governments and industry can do to reduce emissions and to foster research that will help us understand the global climate and devise technologies to protect it.

Mobil has already begun. We are promoting energy savings throughout our operations. We are funding research into the scientific and economic consequences of climate change. And we're supporting research focused on technology solutions. We intend to do more. Our efforts multiplied a thousandfold by governments and industry around the world can do much to alleviate the potential problem—without the pain that must ensue if emissions are cut without a clearer sense of the consequences.

We urge the delegates at Kyoto to resist a "quick fix"—but instead to ponder what will truly benefit our planet. Any solution must be long term and truly global, requiring commitments from all nations. We are counting on their wisdom and their prudence.

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# Science: what we know and don't know



As the debate over climate change heats up, science is being upstaged by the call for solutions. At stake is a complex issue with many questions. Some things we know for certain. Others are far from certain.

First, we know greenhouse gases account for less than one percent of Earth's atmosphere. The ability of these gases to trap heat and warm Earth is an important part of the climate system because it makes our planet habitable. Greenhouse gases consist largely of water vapor, with smaller amounts of carbon dioxide ( $\text{CO}_2$ ), methane and nitrous oxide and traces of chlorofluorocarbons (CFCs).

The focus of concern is  $\text{CO}_2$ . While most of the  $\text{CO}_2$  emitted by far is the result of natural phenomena—namely respiration and decomposition, most attention has centered on the three to four percent related to human activities—burning of fossil fuels, deforestation. The amount of carbon dioxide in the atmosphere has risen in the last 100 years, leading scientists to conclude that the increase is a result of man-made activities.

Although the linkage between the greenhouse gases and global warming is one factor, other variables could be much more important in the climate system than emissions produced by man.

The UN-sponsored Intergovernmental Panel on Climate Change (IPCC) thought it had found the magic bullet when it concluded that the one-degree Fahrenheit rise in global temperatures over

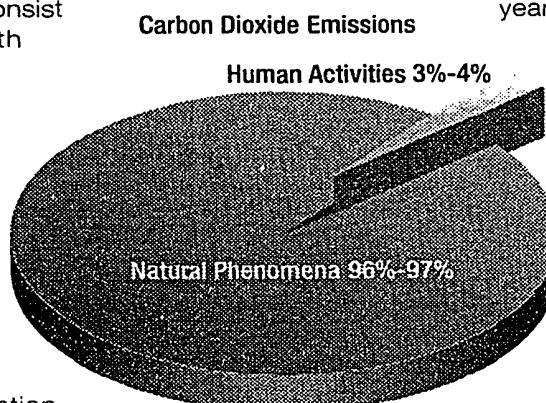
the past century may bear a "fingerprint" of human activity. The fingerprint soon blurred when an IPCC lead author conceded to the "uncertainty inherent in computer climate modeling."

Nonetheless, nations at Kyoto are being asked to embrace proposals that could have potentially huge impacts on economies and lifestyles. Nations are being urged to cut emissions without knowing either the severity of the problem—that is, will Earth's temperature increase over the next 50–100 years?—or the efficacy of the solution—will cutting  $\text{CO}_2$  emissions reduce the problem?

Within a decade, science is likely to provide more answers on what factors affect global warming, thereby improving our decision-making. We just don't have this information today.

Answers to questions on climate change will require more reliable measurements of temperature at many places on Earth, better understanding of clouds and ocean currents along with greater computer power.

This process shouldn't be short-circuited to satisfy an artificial deadline, like the conference in Kyoto. Whatever effect increased concentrations of man-made gases may have, it will develop slowly over decades. Thus, there is time for scientists to refine their understanding of the climate system, while governments, industry and the public work to find practical means to control greenhouse gases, if such measures are called for. Adopting quick-fix measures at this point could pose grave economic risks for the world.



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# CNN and the value of instant replay



October. Baseball interest peaks and pro football holds its Sunday rituals. And with these October contests, the question of instant replay will undoubtedly resurface. Traditionalists will say no to change, and the progressives will view the ability to revisit a decision in the pursuit of integrity as the ultimate in fairness and objectivity.

CNN just cast a vote for the replay. And in so doing suggested that fairness and objectivity are the cornerstones of integrity and reputation. We salute CNN in its pursuit of fairness.

Two weeks ago, CNN responded to a series of challenges by environmental groups to industry messages on global climate change. It decided to withdraw TV commercials submitted by a coalition of farm, labor and business groups. CNN management cited a policy decision that "advocacy commercials" should not air on an issue that would receive significant news coverage from CNN reporters. Commercials submitted to CNN from the coalition, said the network, as well as commercials from environmental activist groups like Greenpeace and the Sierra Club, would no longer be aired.

Enter the replay last week. Upon reviewing protests from industry groups regarding its policy statement, CNN subsequently "took an officials' time-out and reviewed the tapes." It reversed its decision, stating that "CNN always has sought to provide news and advertising to its viewers in a highly responsible manner, including all sides of controversial issues." CNN's request for further substantiation and appropriate revisions if substantiation didn't support the claim was reasonable. It's what companies go through frequently to ensure that consumers are receiving valid and truthful pro-

motional messages. CNN's standards apply to the coalition commercials and the environmentalist messages alike.

Over the years in our weekly editorials, Mobil has offered occasional criticism of media treatment of the industry as sometimes unfair and biased. And we'll probably offer some of that perspective in the future. But the action by CNN management to allow fairness and balance to prevail deserves our mention as well.

Was CNN's decision an easy one? No. Not when internal dynamics and external scrutiny put the network under a microscope. Was CNN's decision made under pressure from industry? We're sure that there was a lot of passionate "traffic" on the subject coming from all sides of the global climate debate—traffic including Mobil's.

Was CNN management's decision fair? Absolutely. The news organization said, "Our reputation for fairness is one which we consider fundamental." And fairness, we believe, was at the heart of the decision—a decision we're sure was accompanied by vigorous and passionate debate.

At Mobil, we do have a point of view on global climate change as well as views on many other issues. And we know they're not always the most popular. But we'd like the public to know where we stand. We also respect the views of others who disagree. We believe all arguments, when offered constructively and without personal attack, deserve hearing.

That's why we salute the CNN replay. It allows constructive debate and legitimate differences to be aired so that people can form their own opinions.

Nice call, CNN. Sports' governing bodies might take a lesson.

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# Global climate change



If this issue hasn't captured your attention yet, it will shortly. That's because government representatives will meet in Kyoto, Japan, in early December to see if they can agree on a plan to control carbon dioxide (CO<sub>2</sub>) and other greenhouse gases that may be linked to global warming and climate change.

Because our products—oil and gas—are at the center of the climate change debate, some say we are indifferent to growing concerns over the buildup of man-made greenhouse gas emissions. Not so. We share many of these concerns. But some key questions remain unanswered.

Others say we're not doing anything to reduce emissions; we only care about finding more oil, making more money. Not true. We have already taken steps to cut emissions and we're ready to do more. Yes, we're looking for more hydrocarbons because energy demand is increasing and, for now, there's no real alternative. And yes, the financial stakes are important. Just ask shareholders, employees and others who benefit.

We want to play a constructive role in the policy debate on climate change. It's an issue that defies simplification and doesn't lend itself to easy solutions.

In the coming weeks, we'll wade into the debate, beginning with what we do and don't know about greenhouse gases and climate change. Then we'll look at emission control strategies and examine their economic impact. We'll also describe what Mobil is doing and give you our point of view.

Because we believe there is potential reason for concern, there are measures we can take that will give us time to get better data so governments don't have to commit to policies that will damage economies. Many companies are taking such steps. Here is what Mobil is doing:

**Inside Mobil.** Programs to reduce our own emissions include use of energy-saving technology at refineries, energy management audits, initiatives to reduce gas flaring offshore, elimination of methane leaks and participation in government-sponsored programs in the U.S. and elsewhere. In the last three years, we've cut our carbon emissions by more than one million tons; this pace will accelerate.

**Our products.** Mobil synthetic lubricants increase engine efficiency, cutting carbon dioxide emissions. Since 1990, use of these products has reduced vehicular carbon emissions by one million tons.

**Research.** Mobil is continuing to fund research to improve the science and economics of climate change.

**Technology.** Through business/university consortia, we're supporting development of refining and hydrocarbon fuel technologies that promise higher efficiency and lower emissions.

**Reforestation.** Working with leading environmental groups, Mobil will underwrite international projects to plant and protect trees which absorb significant amounts of CO<sub>2</sub>. Initiatives like these, which are good for the environment, can be taken while the debate continues.

As the deadline in Kyoto approaches, there's considerable pressure to reach an agreement. Frankly, the pressure seems misplaced. Let's not rush to a solution before we fully understand the dimensions of the problem. A measured approach—one that relies on actions by businesses, consumers and governments—gives us time to clear up the uncertainties surrounding climate change.

Sustained actions, better science and improved technologies will point the way to realistic policies. We all share the same goal: protecting Earth's environment while raising living standards for all.

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# Reset the alarm



The alarm is about to go off as the Kyoto deadline approaches. Government negotiators meet in a month to decide on a mandatory plan for industrialized nations to cut their emissions of carbon dioxide and other heat-trapping gases. But imposing a solution before the problem has been defined could prove a rude awakening for the developed and developing countries.

Basically, three proposals are under consideration. The European Union plan wants industrialized nations to cut greenhouse gas emissions 15 percent below 1990 levels by 2010. Japan's plan calls for reducing emissions five percent below 1990 levels between 2008 and 2012. The U.S. plan targets a return to 1990 emissions levels over the 2008–2012 period, with additional cuts coming later.

The U.S. plan also encourages joint implementation projects—where one country invests in an emission-reduction project in another country and earns credit for the reductions at home—and emissions trading. More importantly, the U.S. plan recognizes that developing countries, which will become tomorrow's largest carbon emitters, must participate in the solution. The president said the U.S. will not "assume binding obligations unless key developing nations meaningfully participate in this effort." The problem is that if they aren't signatories and participants to a treaty that binds them to action, then there's no global solution.

Energy conservation and development of energy-efficient technologies in the U.S. via tax cuts and other incentives are also under consideration.

At first reading, the U.S. proposal seems moderate. We're encouraged by the call for voluntary, market-based steps. But we're wary of incentives, which are usually subsidies in disguise.

What is not moderate is the call to lower emissions to 1990 levels. A cutback of that size would inflict considerable economic pain.

The Energy Information Agency projects that energy demand in industrialized nations over the 1990–2010 period will grow about 30 percent. Committing to binding targets and timetables now will alter today's lifestyles and tomorrow's living standards. Flexibility will be constrained. Carpooling in; sport utility vehicles out. High fuel and electric bills. Factory closures. Job displacement. And could businesses and consumers cut their energy consumption by 30 percent without some form of tax or carbon rationing? Probably not.

Let's face it: The science of climate change is too uncertain to mandate a plan of action that could plunge economies into turmoil. Yet, that's what nations seem prepared to do.

Scientists cannot predict with certainty if temperatures will increase, by how much and where changes will occur. We still don't know what role man-made greenhouse gases might play in warming the planet.

We're not impugning the existing science or suggesting that "our science is better than your science." Current science isn't bad; it just doesn't go far enough. Better science is emerging on what factors affect global warming. No need to wait 20 or 50 years; big breakthroughs that will dramatically inform our decision-making are expected in the next five to 10 years. Scientists are getting more precise in calculating temperature variations; they're probing the role of clouds and oceans on climate. Such information can take much of the guesswork out of what and where actions will be needed.

In the meantime, businesses, individuals and governments can take precautionary, voluntary steps to reduce their emissions. And we can begin to work more closely with developing nations to help them grow their economies in energy efficient ways.

Let's not rush to a decision at Kyoto. Climate change is complex; the science is not conclusive; the economics could be devastating. And the world's not ready for it. Reset the alarm and take the time to get it right.

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# Post Kyoto, what's next?



Just weeks ago, representatives from more than 150 nations agreed to do something about the prospect of climate change by selectively limiting emissions of greenhouse gases.

Earlier this week, addressing global warming in the State of the Union Message, the president proposed tax cuts and research and development to encourage innovation, cleaner factories, fuel-efficient cars, energy-efficient homes. We look forward to seeing the details of this program.

The Kyoto protocol is the first step in a lengthy process. It sets the goals and a framework for lowering emissions. Now the mechanisms and rules need to be worked out.

Negotiators must address a number of questions, including:

**Compliance.** Who will monitor individual nations' progress?

**Participation.** At what point will developing nations begin to participate in emission-reduction activities? Emissions from developing countries, which are expected to build rapidly in the coming years, are not covered by the agreement. Most developed countries, though, must reduce their emissions of carbon dioxide and other gases by 6 to 8 percent from 1990 levels by 2012.

**Institutions and methodologies.** Who will monitor the emission trading, joint implementation and clean development pro-

grams? What rules will govern their operation? As observers have noted, there is considerable room for mischief in the details of these mechanisms.

Here in the U.S., the debate is likely to center on trade-offs. How much prosperity are Americans willing to forgo? How many lifestyle changes will they have to make? How much more tax will they pay? To meet the U.S. commitment for 2010, energy use in this country must be reduced by 33 percent. That's a challenge that cannot be dismissed with the wave of a magic wand. Our leaders must let the public know how they propose to achieve this goal.

Credible economic studies have pointed out that mandating emission targets and timetables now will have an enormous negative impact on many national economies. Nonetheless, we share the growing concerns that governments, the public and many of our customers have about the buildup of greenhouse gases. That is why we have moved to curb our own emissions, improve energy efficiency and focus research efforts on emission-reduction technology.

Over the next several months, Congress is scheduled to hold hearings on the climate change treaty. We encourage the public to participate in the debate over the issue. Important decisions affecting lifestyles and our nation's economic future will be made. Your input can and should count.

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# The Kyoto Protocol: a painful response

 While most Americans focus on the here and now—election results, football scores—longer-term issues bear watching because they ultimately can affect the here and now. One such issue is climate change.

Mobil is concerned about the potential for human activities to affect climate. That's why we support voluntary efforts to reduce emissions. The Kyoto Protocol has been billed as a solution. It isn't the right one. It only focuses on emissions in developed countries, will only minimally reduce the amount of greenhouse gases in the atmosphere and will produce major economic distortions in the U.S. and elsewhere.

Credible private-sector studies have detailed Kyoto's potential economic effects. And now, a U.S. government report provides further evidence of what to expect.

Earlier this year, analyses by WEFA, Inc., and Standard & Poor's DRI concluded that the only way the U.S. could meet the Kyoto-mandated emissions target is to significantly increase energy prices, force conservation and promote fuel switching—all at considerable cost.

WEFA estimates the cost of achieving the Kyoto target by 2010 would result in a loss of 2.4 million jobs, a doubling of electricity prices and an annual loss in economic output of \$300 billion—an amount greater than our nation's expenditures for primary and secondary education. Ditto DRI's conclusions: job losses of more than one million, an increase in electricity prices of nearly 40 percent and a decline in GDP of roughly \$100 billion.

Now the U.S. Department of Energy's Energy Information Administration (EIA) reports the mandated emissions cap could cost the U.S. far more than the Administration

estimates. EIA examined six emission reduction scenarios and concluded that as higher energy costs work their way through the economy, the annual loss in GDP could range from \$150 billion to \$400 billion. That translates to an annual cost of \$1,500 to \$4,000 per family.

The Administration's Council of Economic Advisors (CEA) estimates the annual GDP penalty at \$7 billion–\$12 billion, or a cost per household of \$70–\$110. Why this rosy picture? Because the CEA is counting on the U.S. being able to meet most of its target by relying on a global emissions trading system. Yet, the Kyoto Protocol limits emissions trading to the developed countries.

While emerging economies probably offer opportunities to reduce emissions at lower costs than in the U.S., some nations like China and India have said they are unwilling to participate in such schemes.

Just 15 months ago, the U.S. Senate voiced its concerns over ratifying a treaty that would cause serious harm to the U.S. economy or that did not include participation by developing nations. Those concerns still have not been satisfied.

This week, negotiators are meeting in Buenos Aires to discuss the complex rules to implement the Kyoto Agreement. Emissions trading is certain to be on the agenda. Serious differences already exist on the percentage of reductions that should come from domestic actions rather than trading. The U.S. would argue for no restrictions; the European Union wants at least 50 percent of the reductions to come from domestic steps.

While complex mechanics continue to be worked, the fatal flaws of the Protocol—mandated emissions targets, selective participation and economic distortions—still persist.

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# Helping Earth breathe easier



As we live and breathe, we are sustained by an intricate life-support system: trees and other plants scrub carbon dioxide (CO<sub>2</sub>) from the atmosphere and replace it with oxygen. This leafy canopy, once so dense that Julius Caesar's legions marched for two months, from Poland to Gaul, without ever glimpsing sunlight, has been reduced both in size and diversity. This ecological shift has left its mark on many living things.

As a producer and provider of fossil fuels and a citizen of many lands, Mobil recognizes the growing concerns about the buildup of greenhouse gases, like CO<sub>2</sub>, and its potential contribution to climate change. That's why we have supported voluntary actions, like planting trees to increase absorption of CO<sub>2</sub>, to help reduce the buildup. Thus, we're pleased to extend our support of three organizations that have been instrumental in forest conservation, preservation of environmentally sensitive habitats and protection of global biodiversity.

- American Forests, the nation's oldest nonprofit conservation organization (founded in 1875) whose "Global Releaf 2000" program is mobilizing people around the world to plant and care for trees.

- The Nature Conservancy, which over the past 50 years has helped protect more than 10 million acres of ecologically important habitats in the United States and more than 55 million acres in other countries.

- Conservation International, which identifies ecological hotspots in the Americas, Asia and Africa and tries to harmonize their biodiversity with appropriate development for indigenous peoples.

In support of American Forests, Mobil this year will fund the planting of 500,000 trees in watersheds, state and national forests and

wildlife refuges in California, Maryland, New York and Texas. This builds on our program last year that helped American Forests plant half a million trees in Florida, Virginia and Wisconsin.

The Nature Conservancy will use a Mobil grant for the development phase of the "Central Selva Climate Action" project in Peru. This is a multipronged attempt to preserve the area's rich diversity of plant and animal life, generate greenhouse-gas benefits and contribute to the sustainable development of the indigenous community. Our support will be used to focus on forest protection and management as a way to mitigate greenhouse-gas emissions. It will be conducted in partnership with ProNaturaleza, a Peruvian environmental organization. Mobil's support of The Nature Conservancy dates to 1976 and has included donations of environmentally sensitive lands in Texas, Florida, Virginia and California.

Our grant to Conservation International will help fund a feasibility study of tropical-forest preservation in Aceh, Indonesia, a province on the island of Sumatra. Conservation International seeks to enhance protection of the remaining rain forests with community-based conservation and utilization of natural resources. In recent years, Mobil has worked with CI to evaluate and monitor the ecological and social effects of oil exploration in the rain forests of southeastern Peru.

While these initiatives are modest, they represent a win-win step and address a potential problem that could require a global long-term solution. Given our knowledge of costs, benefits and technology options at this time, we believe such voluntary approaches with extensive participation represent a more appropriate response to the global climate issue than imposed mandates.

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**Climate: Technology and Carbon Dioxide Emissions—3**



The concentration of CO<sub>2</sub> in the atmosphere today is 30 percent higher than it was in the days before industrialization. As developing countries grow their economies and increase their CO<sub>2</sub> emissions, concentration levels are certain to grow higher still.

This buildup isn't due to any one country, and it didn't come about in any single year. It has grown from global sources over time because of the long life of CO<sub>2</sub> in the atmosphere. And the buildup is a concern to some because of the role that it may play in global climate change. Policy-makers are talking about the goal of stabilizing atmospheric CO<sub>2</sub> concentrations—getting to a point where the concentrations stop increasing.

Our study shows this simply cannot be done short-term, but as part of our assessment we considered what might be accomplished over a longer term—to 2100—if strong measures are called for. Using the widely respected Global Energy Model developed by Battelle, we examined two potential targets that are often discussed by policy-makers. What would it take to stabilize CO<sub>2</sub> concentrations at twice the preindustrial level? And what would it take for stabilization at twice today's level?

The tougher goal—stabilization at twice preindustrial levels—would mean reducing global CO<sub>2</sub> emissions by almost 75 percent beyond what they would be with ongoing improvements in energy efficiency. The goal

could be reached only if all countries participate by conserving energy, switching to lower-carbon fuels, using more renewables, investing in nuclear energy and implementing CO<sub>2</sub> capture and storage. The costs would rise steeply with time and affect the standard of living that future generations could achieve.

Stabilizing at twice today's level of CO<sub>2</sub> concentrations would mean reducing global CO<sub>2</sub> emissions by 50 percent beyond what can be achieved with ongoing improvements in energy efficiency. It would require the same sorts of measures as the more challenging goal, but to a lesser extent. Less drastic actions would be called for and they could be phased in at a later date.

We don't know whether stabilization is necessary and, if so, at what level. Our study shows that stabilization at twice today's concentration levels can be achieved. Getting there would not be easy. It would take an unprecedented worldwide effort. Only advanced technology, implemented on a global scale with a sufficiently long time frame, can provide the least-cost pathway.

**Next: Lessons learned**

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**A correction:** Last week in the concluding paragraph we said, "developed nations can cut global emissions by eight million tons from a projected 45 billion tons annually in 2030." The correct amount is eight **billion** tons.

For a copy of *Climate: Technology and Carbon Dioxide Emissions—A Global Review and Assessment*, visit our Web site at [www.mobil.com/climate](http://www.mobil.com/climate).

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**Climate: Technology and Carbon Dioxide Emissions—4**

# Lessons learned



This series of messages, and the research that prompted it, are intended to stimulate realistic discussion about how nations might respond to the global growth of carbon dioxide (CO<sub>2</sub>) emissions and the buildup of CO<sub>2</sub> levels in the atmosphere.

While our intention is not to promote any particular course of action, a number of conclusions emerged which have policy implications.

**Short-Term (To 2030).** Although CO<sub>2</sub> emissions from developed and developing countries are about equal today, the push for economic growth will lead to a doubling of emissions from developing countries over the next 30 years. In the meantime, emissions from developed countries will begin to level off.

■ In the transportation sector, global CO<sub>2</sub> emissions will continue to grow, even as developed countries rapidly integrate advanced fuel-efficient technologies. Developed countries could push vehicle emissions back to 1990 levels by 2020, but it would require an unprecedented rate of transition to a hybrid and fuel cell fleet.

■ Similarly, in the electric power sector, growing demand will boost CO<sub>2</sub> emissions even with rapid implementation of highly efficient generating technology. Renewable forms of energy could play a role, but they have limitations that make them impractical or expensive for most applications. Solar, with a cost breakthrough, along with CO<sub>2</sub> capture and storage, offers the greatest potential in this sector.

■ In the residential/commercial and industrial sectors, once again the rise in CO<sub>2</sub> emissions is inevitable because of economic growth. Cogeneration offers the best opportunities to reduce emissions in these sectors.

**Longer-Term (To 2100).** Reasonable forecasts suggest that by 2100 CO<sub>2</sub> emissions could quadruple, which would almost double today's concentration of CO<sub>2</sub> in the atmosphere.

If stabilization of CO<sub>2</sub> concentration in the atmosphere were to become a policy objective, it would take a concerted effort, requiring:

■ Great strides in increased energy efficiency, implementation of advanced technology, a switch to renewable energy and low-carbon fuels, additional investment in nuclear power and capture and storage of CO<sub>2</sub>.

■ Unprecedented global participation and management of the world's energy resources.

Clearly, stabilization could be achieved only at considerable cost. It's also clear that doing too much too soon, before new technology is proven and available, would add to the cost.

Global economic models suggest that there is a penalty for haste. The world has time to determine whether stabilization is necessary. It also needs the time to develop the most promising technologies and to apply them globally—in every sector, in every nation. That's the only way we can reap the full potential of advanced technology.

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For a copy of *Climate: Technology and Carbon Dioxide Emissions—A Global Review and Assessment*, visit our Web site at [www.mobil.com/climate](http://www.mobil.com/climate).

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**Climate: Technology and Carbon Dioxide Emissions—2**

# Some ways to make a difference



Last week, we saw that, for the foreseeable future, energy use will increase in tandem with world economic growth. With fossil fuels powering much of that climb, CO<sub>2</sub> emissions will also increase. Continuing our assessment, we now look at the various sectors of the economy to see what role advanced technology could play in reducing CO<sub>2</sub> emissions by 2030.

Can technology make a difference? The answer is, "it depends."

For developed countries, it can. Their economies are mature and their populations are largely stabilized, so investing in energy efficiency can halt the growth in CO<sub>2</sub> emissions. In developing countries, capital is scarcer, other needs are more pressing and growth in fuel use far outstrips the impact of normal efficiency gains.

Let's see what is possible:

**Transportation:** The technology for tomorrow's passenger vehicles is in various stages of development. Advanced diesel engines are the closest to market. While hybrid and fuel-cell vehicles may take longer to become commercially viable, both promise to markedly reduce CO<sub>2</sub> emissions. But the long life of passenger vehicles (12–15 years on average) and the time required for new technology to dominate the automotive fleet mean that a big change is not around the corner.

If the U.S., Western Europe and Japan rapidly adopted these new vehicle technologies, automotive CO<sub>2</sub> emissions there could be substantially below their 1990 level by 2030.

However, carbon dioxide from transportation will more than double by 2030, driven largely by an increase in the number of vehicles in developing countries and continued growth in other transportation modes—aviation, shipping and trucking. So even with all these improvements, global transportation emissions would be reduced only by about seven percent from that projected for 2030.

**Electric power generation:** Here, there are a number of pathways. Globally, electric generation is projected to triple over the next 30 years and associated CO<sub>2</sub> emissions will more than double. If developed countries moved to more efficient plants and switched to lower-carbon fuels (natural gas), they could cut their projected CO<sub>2</sub> emissions by as much as 40 percent in this time frame. Again, growth in the rest of the world will far surpass this reduction.

Renewables can be a factor. Biomass and wind are nearing cost competitiveness with new power generators, but they have inherent capacity limitations. Solar's role could be larger if technological breakthroughs drive down its current high costs. Another promising alternative is the capture of CO<sub>2</sub> produced by fossil fuel power plants and its storage permanently underground in depleted oil and gas reservoirs.

**Industrial:** This sector is generally energy-efficient, but advanced technology (more efficient boilers, motors, etc.) and greater use of cogeneration could slow emissions growth. Cogeneration utilizes waste heat from power generation for other purposes, such as heating.

**Residential/commercial:** Upgrading and retrofitting homes/buildings can improve energy efficiency. But gains here over the next 30 years are limited by the slow rate of building turnover (50 to 100 years) and the high cost of energy-saving technologies.

What can be gained? Advanced technology widely implemented by developed nations can cut global emissions by eight million tons from a projected 45 billion tons annually in 2030. The sheer growth—more than doubling—in emissions that will occur in the rest of the world simply overwhelms these reductions.

**Next week we'll look beyond 2030.**

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For a copy of *Climate: Technology and Carbon Dioxide Emissions—A Global Review and Assessment*, please call 1-800-293-5796.

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**National priorities and policies-1**

# An agenda for tomorrow

 As the countdown to the 21st century begins, the nation should celebrate what's been accomplished and focus on what will be needed in the new century.

In coming weeks, Mobil intends to discuss some potential items for this agenda. Directly or indirectly—as an international company, a provider of transportation fuels and as an employer—we have a stake in their outcome.

Few nations get the opportunity to reflect on the future and take early steps to mold it. The United States has this luxury today. A confluence of international and domestic events has made it possible. The Cold War melted before our very eyes, pushing new actors onto the global stage and allowing the U.S. to realign many of its relationships. After more than 30 years of red ink, the federal budget is balanced and surpluses seem assured for several years. The economy continues to perk along nicely, with inflation at a minimum and more people than ever working.

Admittedly, all is not rosy. Internationally, ethnic strife continues to brutalize citizens, and weapons of mass destruction lie in too many wrong hands. Here at home, significant pockets of Americans remain outside mainstream prosperity. But the environment is significantly more conducive today for policy-makers to define our national and international priorities and to engage the public in deciding what policies should be undertaken.

**■ Fixing the international financial system.** Financial crises continue to destabilize global markets. Policy-makers know the system needs reform—sooner rather than later—and that whatever prevails will require compromise. Recent proposals from the International Monetary Fund on acting as a "lender of last resort" provide a starting point for discussion.

**■ The environment.** Congress may revisit environmental legislation again. We

hope common sense prevails with an eye to improving the regulatory process without impairing the underlying standards. Greater flexibility could make regulations more cost effective. Legislation tied to concerns over global climate change may surface, too.

**■ Transportation—what lies ahead?**

Cars are an indispensable fact of life; concern for the environment is, too. How can we balance Americans' personal needs for convenient, reliable and inexpensive transportation with the nation's collective desire for a cleaner environment? Improved fuels and technology can deliver lower-emission, more energy-efficient vehicles; let's examine what's ahead.

**■ Trade.** Consumers and producers benefit from trade; one-third of U.S. growth is trade-related. Yet, many Americans say, "Raise the drawbridge, keep jobs here and that foreign stuff out." Growing talk of protectionism threatens to undo 40 years of trade gains. Are there policies that can help trade losers become winners? Are trade sanctions an effective foreign policy tool?

**■ Education.** Despite the billions spent on education, student performance continues to lag. Americans expect high marks from their schools; students and teachers need to be accountable to higher standards. U.S. graduates must be technically competent if they are to be competitive with their global counterparts; business and the federal government must also help.

How these issues play out will affect all of us profoundly. Right now, the strength of our nation's institutions is being tested. The republic will survive and, hopefully, wounds will heal so that we can get on with the nation's business.

As readers consider these issues in coming weeks, we urge you to share your thoughts with your elected representatives. A thoughtful citizenry is critical to the health of our nation.

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# In our backyard



It will come as no surprise that imports of crude oil and petroleum products to the U.S. have grown by almost 25 percent in the last 20 years. Today, the United States imports about 54 percent of the crude oil that it needs.

We import more than we produce in part because most of the U.S. has become what's known as a "declining province." Presumably, most of the big U.S. discoveries have already been made, and domestic production is almost certain to continue to decline, as it has generally since 1985.

Or so the story goes.

While there's some truth to this conventional wisdom, it's also true that technology opens new frontiers in unexpected places—such as our own backyard.

The case in point is the Gulf of Mexico, which has been producing oil and natural gas since the 1940s. It would be easy to believe that the Gulf, extensively explored for more than 50 years, has no more big fields to supply the country's needs in years to come. But a new discovery, announced last week, contains an estimated potential of at least a billion barrels of oil—which would make it one of the largest-ever domestic oil discoveries. The field, known as Crazy Horse, lies 125 miles southeast of New Orleans.

What made the discovery possible was the oil industry's growing technological ability, allowing exploration and producing to occur

economically in ever-deeper waters. This discovery was made in water more than 6,000 feet deep, which would have been unthinkable, not to mention cost prohibitive, just a few years ago.

In the 1950s and 1960s, it was the helicopter that helped push the frontier of exploration and producing in the Gulf of Mexico. That was followed by advances in the design of exploratory rigs and producing platforms.

Today, it's the deepwater technology that's pushing the proverbial envelope. Drillers probe for oil in wells thousands of feet below the seabed from vessels on the surface that are dynamically positioned with the help of huge thruster engines. And development of directional drilling now allows multiple wells to be drilled and operated from a single location.

The overriding lesson here is that, while the U.S. may not be able to turn the tide on declining production and increasing imports, we can slow the process.

As this discovery demonstrates, though, the Gulf of Mexico alone still has enormous potential. Moreover, it's an area where the industry can point with pride to years of safe and responsible operations. Policymakers should encourage the U.S. oil and gas industry to continue to pursue opportunities there, which are growing rather than shrinking as improving technology opens new doors.

While there will always be greener pastures elsewhere, our backyard is still an inviting spot.

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**Climate: Technology and Carbon Dioxide Emissions—1**

# Where we are and where we may be heading



Reasonable concerns about the buildup of greenhouse gases in the atmosphere and their effect on earth's climate have prompted policymakers to search for a response. Some countries seem eager to embrace the "quick fix" of the Kyoto Protocol. Others, for compelling economic reasons, are less prepared to act.

As a company whose products—fossil fuels produce carbon dioxide (CO<sub>2</sub>), the most significant manmade greenhouse gas—figure prominently in these discussions, we want to move this debate forward so that policymakers will develop an appropriate and prudent response.

Because technology will play a key role in efforts to reduce CO<sub>2</sub> emissions, we asked our engineers and scientists for some perspective on the issue. They developed an assessment in response to several questions:

First, what activities produce manmade CO<sub>2</sub> emissions today and where are emissions headed in the foreseeable future—to 2030? Second, what role can advanced technology play in reducing these emissions? Third, looking beyond to the end of the 21st century with the help of a global economic model, what can we reasonably expect to happen? And finally, if nations decide to stabilize CO<sub>2</sub> levels, what actions are available and what outcomes are feasible?

In formulating the answers, our scientists and engineers incorporated the best thinking of a number of respected research institutions. This assessment\* was not intended to promote any particular course of action, but to examine the options and explore the realistic

limits of what nations can accomplish should they decide stronger measures are called for. Over the next several weeks, we intend to share what we learned.

As a baseline, the study projected how manmade CO<sub>2</sub> emissions will increase if the global economy continues to grow; it assumed that some ongoing improvements in energy efficiency would occur. Then it examined how advanced technology applied more rapidly and widely in developed countries over the next 30 years could affect global CO<sub>2</sub> emissions.

The analysis looked at various economic sectors—transportation now accounts for 23 percent of global CO<sub>2</sub> emissions; industrial, 25 percent; electric power generation, 34 percent; and residential/commercial, 18 percent—to see what impact technology could have on future emissions. Next week, we'll examine these sectors.

Throughout the analysis, one basic fact stood out. The effect of economic growth that will occur in developing countries simply overwhelms whatever developed countries can achieve with advanced technology. Energy use rises with economic growth, and fossil fuels—particularly in the transportation sector—will continue to provide the lion's share of energy for the foreseeable future. Meaningful efforts to alter the magnitude and upward course of CO<sub>2</sub> emissions will have to apply across the board and around the globe.

## **Next: Using advanced technology to reduce emissions**

\*For a copy of *Climate: Technology and Carbon Dioxide Emissions—A Global Review and Assessment*, please call 1-800-293-5796, beginning July 30.

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# EXHIBIT N

## Exhibit N: Exxon Advertisements

XOM 1999 Dec 2 NYT: Once in a lifetime	12/2/1999
XOM 1999 Dec 9 NYT: Tomorrows energy needs	12/9/1999
XOM 1999 December 10 NYT: merger ad	12/10/1999
XOM 2000 Jan 6 NYT: Resolutions for the new century	1/6/2000
XOM 2000 Jan 27 NYT: Making gasoline from tar	1/27/2000
XOM 2000 Feb 10 NYT: A bull market with a China shop	2/10/2000
XOM 2000 Feb 17 NYT: Generating heat	2/17/2000
XOM 2000 Mar 16 Do No Harm	3/16/2000
XOM 2000 Mar 23 NYT: Unsettled science	3/23/2000
XOM 2000 Mar 30 NYT: The promise of technology	3/30/2000
XOM 2000 April 20 NYT: An anniversary to celebrate (Earth Day)	4/20/2000
XOM 2000 Jul 6 NYT: The promise of hybrids	7/6/2000
XOM 2000 August 3 NYT: Powering the future economy	8/3/2000
XOM 2000 Sept 7 NYT: Sanctions with gums	9/7/2000
XOM 2000 Oct 5 NYT: On the side of the tide	10/5/2000
XOM 2000 Oct 12 NYT: Energy and the environment in developing countries	10/12/2000
XOM 2000 Oct 19 NYT: The third branch	10/19/2000
XOM 2000 Oct 28 Unbalanced Caution	10/28/2000
XOM 2000 Nov 9 NYT: The big push for natural gas	11/9/2000
XOM 2000 Dec 7 NYT: Conservation - the first path	12/7/2000
XOM 2001 Jan 4 NYT: Punitive damages - the "wild card"	1/4/2001
XOM 2001 Jan 11 NYT: A wildcat's legacy	1/11/2001
XOM 2001 Jan 17 Policy for New Admin	1/17/2001

XOM 2001 Feb 8 NYT: From darkness to light	2/8/2001
XOM 2001 Mar 29 NYT: Pounds of prevention, tons of cure (Valdez)	3/29/2001
XOM 2001 Apr 10 Moving Past Kyoto	4/10/2001
XOM 2001 April 17 NYT: ...to a sounder climate policy	4/17/2001
XOM 2001 April 26 NYT: Resurgence of a killer (malaria)	4/26/2001
XOM 2001 June 7 NYT: Science from sea to shining sea (Liberty Science Center)	6/7/2001
XOM 2001 July 12 NYT: China trade: self-interest and statesmanship	7/12/2001
XOM 2001 Jul 19 NYT: Action, not talk - cogeneration and climate	7/19/2001
XOM 2001 Jul 26 NYT: Saudi Arabia - the opening for natural gas	7/26/2001
XOM 2001 Aug 2 NYT: Sifting and winnowing	8/2/2001
XOM 2001 Sept 6 NYT: How much oil is there?	9/6/2001
XOM 2002 Jan 24 NYT: Improving energy use	1/24/2002
XOM 2002 May 2 NYT: Hydrogen - promise and challenge	5/2/2002
XOM 2002 Oct 3 NYT: Managing greenhouse gas emissions	10/3/2002
XOM 2002 Nov 22 NYT: Responsible path forward on climate	11/22/2002
XOM 2003 Jan 23 NYT: Tight gas (fracking)	1/23/2003
XOM 2003 Feb 3 NYT: The global climate energy challenge	2/3/2003
XOM 2003 Feb 20 NYT: Win-win-win	2/20/2003
XOM 2003 May 29 NYT: A growing role for natural gas	5/29/2003
XOM 2003 June 17 NYT: Building the energy future	6/17/2003
XOM 2003 Jul 10 NYT: A look back at the look ahead	7/10/2003

XOM 2003 Aug 7 NYT: Building a more energy-efficient world	8/7/2003
XOM 2003 Aug 21 NYT: Energy beyond 2020	8/21/2003
XOM 2003 Oct 2 NYT: Natural gas - finding a balance	10/2/2003
XOM 2003 Oct 16 NYT: Natural gas - a need for action	10/16/2003
XOM 2003 Nov 4 NYT: By 2020 the world needs to...	11/4/2003
XOM 2004 Jan 21 Climate Research Directions	1/21/2004
XOM 2004 Jan 21 Weather and Climate	1/21/2004
XOM 2004 Jan 22 NYT: Weather and climate	1/22/2004
XOM 2004 Mar 18 NYT: All head safe (Valdez)	3/18/2004
2004 ExxonMobil New York Times ad, 2004 May 12 We're all in this together	5/12/2004
Exxon Secrets Climate Denial Funding 1998 2013	1998/2013

# Once in a lifetime

Great opportunities are rare. This week marks the start of an epic one for us. Exxon and Mobil are merging to create a company that unites the best in each.

While the underpinnings of Exxon and Mobil are historic, what excites us is the future. This merger was born not of necessity, but because of the world's growing need for energy. This merger is a once-in-a-lifetime opportunity to combine our strengths, skills and resources to create the world's premier petroleum and petrochemical company.

The roots of our companies go back to the 19th century. As the 20th century opened, we were part of the legendary Standard Oil. It was a time when kerosene—not gasoline—was king. For most of this century, though, Exxon and Mobil competed vigorously, pursued their own paths and grew their businesses. And they prospered. As the century closes, a new chapter begins.

Exxon and Mobil have been industry leaders in their own right. To combine and magnify these skills—in exploration, production, refining, marketing, chemicals and technology—was a key motivator for our union.

Ever since our intentions were announced last year, we've been measuring ourselves against our world and its future, working to take full advantage of our combined ability to meet the growing energy demands of our customers around the world.

Combining the two companies is an enormous effort, but it's been made easier by the basic compatibility of our organizations and the skills and talents of our people. Historically, we shared many core values—creating wealth for shareholders, concern for safety, health and the environment and commitment to high ethical standards. And both were strong, efficient performers with leadership positions in key businesses.

Expectations for this merger are high. Months of work by teams of people from both sides tell us that our early optimism was well founded. And it has grown.

We're on a new path together because the world and its needs are changing. Together we can meet those needs better than we could by ourselves. And that's the whole point, not to be bigger, but better.

The ExxonMobil logo consists of the words "Exxon" and "Mobil" stacked vertically. "Exxon" is in a bold, black, serif font, and "Mobil" is in a bold, black, sans-serif font. A registered trademark symbol (TM) is located at the top right of the "Mobil" wordmark.

RICO Statement Exhibit\_305

# Tomorrow's energy needs

The green light for the ExxonMobil merger signals the start of an epic journey. It has been a colossal undertaking. While there's still more to be done to bring everyone and everything together, this union promises excitement and benefits.

In the coming weeks, we want our customers, shareholders, partners and communities where we operate to understand why we merged and what to expect from us.

A major driver of our union was the recognition that the world's appetite for energy continues to grow. Wherever we looked—at the wellhead, the refinery or at the pump—companies were lining up to satisfy those demands. Competition—from players with considerable heft, others with niche expertise—was piling on.

Looking ahead to this competition, we realized that while we were both good individually, we could do a much better job together. An ExxonMobil union would enable us to turn more of tomorrow's energy opportunities into reality with unrivaled efficiency.

Consider tomorrow: World population will climb to more than seven billion by 2020 and could approach nine billion by mid-century. As more nations strive to bring prosperity to their citizens, people are looking beyond basic food, clothing and shelter. They want a bigger share of a growing pie. And energy plays a central role in meeting those expectations. In the developing world, energy growth is strongly linked to economic development even more so than in highly developed service-driven economies.

The U.S. Energy Information Agency projects world energy use to climb by more than 60 percent over the next two decades. Most of the gain will occur in the developing countries of Asia and Latin America, where strong economic growth is forecast. By 2020, developing

countries will consume more energy than the industrialized world.

Fossil fuels—oil, gas and coal—will continue to provide most of the world's energy to 2020 and beyond. Oil tops the charts, largely because of its important role in transportation. The efficiency of fuel cells—a technology we're supporting—is very promising, but considerable time will be required for this technology to penetrate the world's transportation sector. And hydrocarbons will still be the most efficient and practical source for powering the fuel cells.

Use of natural gas is expected to increase, particularly in the power generation sector. And many nations will turn to gas because its lower carbon content is considered an environmental plus. Coal will remain important for new power stations in developing Asia and parts of Latin America, where this low-cost fuel is plentiful, in the next 20 years.

Energy experts agree the world has ample supplies of fossil fuel. And as improved technology is brought to bear, resources once considered impractical can become economic. Beyond this, whole new areas of hydrocarbon reserves are yet to be identified. While much of tomorrow's energy is likely to come from remote areas, existing energy assets must be worked more smartly. Companies with resource experience, financial resources and technological strength will be needed to satisfy the world's growing energy needs. Such companies must be sensitive to environmental concerns and the growing desire for greater energy efficiency.

New players—like the recently combined multinationals and large state-owned companies looking to expand outside their home areas—are preparing for those tasks.

So are we. ExxonMobil is putting the people and resources together to get the job done.

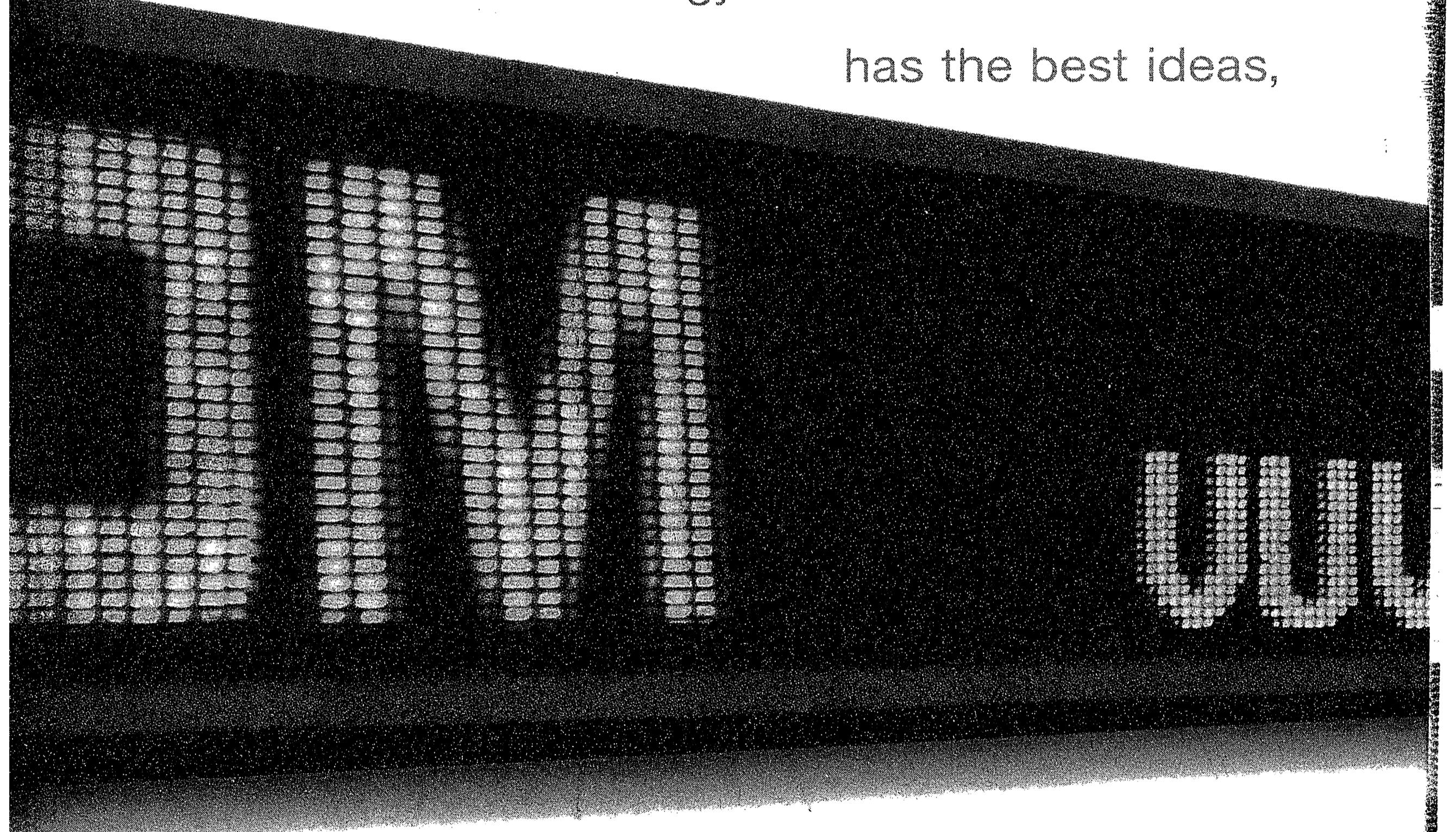
The ExxonMobil logo consists of the company name "ExxonMobil" in a bold, black, sans-serif font. The letters are slightly slanted to the right. The "X" in "Exxon" is stylized with a diagonal cut through it, and the "M" in "Mobil" has a similar cut. A registered trademark symbol (TM) is located at the top right of the "il" in "Mobil".

# Not for brawn, for brains.

It's a new symbol for energy—mental energy.

Because that's what's needed to keep the world humming. The easy oil has been found, so tomorrow's energy will come from whoever

has the best ideas,



technologies and talents. As Exxon and Mobil we were good. But the future needs better. So we've put our names, and brains, together. To be better, quicker, smarter by a lot. **ExxonMobil**

# An anniversary to celebrate

This week marks the thirtieth anniversary of Earth Day, which was started to focus increased attention on environmental conditions. Three decades later, significant environmental progress has been made, with the most dramatic improvements coming in air quality.

According to the U.S. Environmental Protection Agency, aggregate emissions of the six major atmospheric pollutants have declined more than 30 percent since 1970. Moreover, as the accompanying graph shows, this decline has occurred despite substantial growth in economic activity, vehicle miles traveled and increases in population.

Everyone has contributed to these improvements. At ExxonMobil, we've been able to reduce key air emissions at our U.S. plants by more than 35 percent in the last decade. But that's only part of the answer. Much of the decline in air pollution can be attributed to cleaner automotive fuels and technological advances in the engines that power today's vehicles. Eventually, fuel cells or hybrid systems (gasoline plus electric) may permit dramatic reductions in emissions from future vehicles.

Ongoing research and technology are contributing to important environmental benefits in other areas. New chemical catalysts reduce the amount of energy needed for manufacturing as well as feedstock waste, and horizontal drilling improvements mean even less land is needed in oil production operations.

However, despite impressive progress, much remains to be done. There is increasing appreciation that energy and other resources must

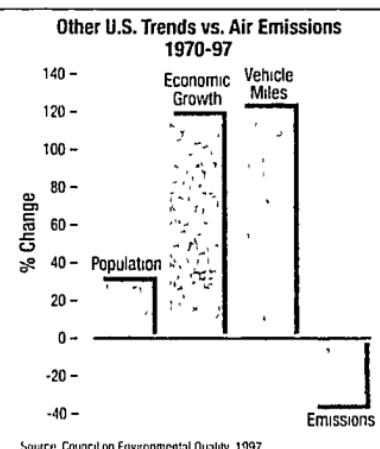
be used more efficiently if we are to limit the potential impact of humans on other species. Developing countries also have a real need to improve their environment, and American firms have much help to offer.

Critics of fossil fuels suggest an array of energy alternatives ranging from solar to biomass, from electric cars to power from water and wind. Alternative fuels do have a role to play, but in the foreseeable future renewables like wind, solar and biomass are economical only in niche markets.

Even agriculture-based energy, such as ethanol derived from corn, can be less friendly to the environment than claimed. Plowing, sowing, irrigating, fertilizing, harvesting and transporting can be quite energy-intensive. And in terms of land surface needed to yield equivalent energy, producing crude oil is about 1,000 times more frugal than growing grain to make ethanol.

To further illustrate the land-use dilemma, Peter Huber, Senior Fellow at the Manhattan Institute, estimates that if New York City were powered by solar energy alone, even on sunny days it would take four times the area of the city to hold the required number of solar panels.

Finally, some claim we're running out of fossil fuels and need to shift now to other sources. Hardly. World reserves of oil and gas continue to increase and are sufficient for many decades to come. And with technological advances continually improving their energy efficiency and reducing their environmental impact, fossil fuels should maintain their rightful place as the energy source for the future.



## ExxonMobil

Technology in the Oil and Petrochemical Industry

# Powering the future economy

Because oil and gas come from long-buried dinosaurs and rotted vegetation, some people perhaps think we're a story from the past rather than a part of the future.

We don't see things this way. Those interested in business and policy should look carefully at the dynamics of our modern economy to understand the central role played by energy, oil and petrochemicals, and the technologies being created in this sector.

*Old and new* economy discussions can be misleading. The *future* economy is likely to be a blend of traditional businesses and new developments, all disciplined by an increasingly sophisticated consumer market. Where will energy and petrochemicals fit into this future economy?

First, energy and petrochemical use will grow because they are imbedded in our economic life, and are the engine of economic growth. Consider that each laptop is mainly made of plastic and eventually has to be plugged into an electric outlet. Order groceries online, and the truck that brings them runs on what we sell. In developing countries, energy growth will be even greater as these nations industrialize. This growth will continue even as its use becomes more efficient.

Both growth and efficiency rely upon the demonstrated ability of energy businesses to create and use *research and technology*. Reflecting this, economic value produced per employee in oil and chemicals has increased rapidly — twice as fast as for all manufacturing, for example (see chart).

Newer technologies include advanced vehicles, innovative exploration and drilling techniques, processes to turn natural gas into liquid fuels, precision catalysts for specialized chemical products, and high-strength steels for gas transmission. The Internet will be another major tool for improving business efficiency, with a role to play in energy services that is still evolving.

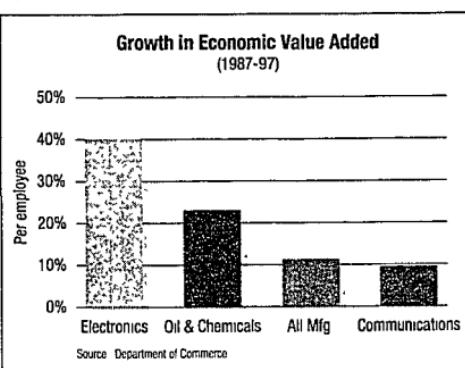
There is an increasing appreciation that *real profits* are needed to attract investors and capital, expand business and conduct research. Well-run energy companies make and attract capital and can use their financial strength to invest in more energy supplies and environmentally cleaner products.

Just as important, industries and firms must now be competitive and engaged worldwide. Growth and economic opportunity

outside the United States are and will continue to be among the most important and beneficial features of this and future centuries. For billions of people in developing countries, the modern use of energy will transform their lives, freeing them from drudgery while greatly increasing their comfort and mobility.

The talk about new and old economies seems to miss a lot of these elements.

We are admittedly biased. We think that the characteristics of the energy and petrochemical industry — growing demand, research and technology, real profits and global operations — make it an inevitable part of the future economy. We will help drive this future. Just watch.



**ExxonMobil**

# Conservation: the first path

Just last month, the latest intergovernmental negotiations on addressing potential climate change were unsuccessfully concluded. Much disagreement was centered on energy reduction *mandates* and how to account for the carbon-absorbing capacity of forests.

Less attention was paid to what can be done through responsible actions to conserve energy, driven by considerations of efficiency and economics.

Our business provides some very good examples:

In order to serve our customers worldwide, we make over 14,000 daily deliveries of oil products, and our trucking fleet drives more than **one million miles each day**.

That's equivalent to two round trips to the moon. Clearly, we have a strong interest in any measures that permit more efficient truck routing and that increase the fuel efficiency of our vehicles. Mandates aren't needed for us to work hard to save money implementing these measures.

Another example is energy use in refineries and petrochemical plants

Today, about 10 percent of the energy in a barrel of crude oil is used when refining it into products such as gasoline, heating oil and petrochemicals. In our refineries, we use energy equivalent to more than 25 million gallons of crude each day just to produce useful consumer products. The more we can save, the lower our costs.

We have already improved the energy efficiency of our plants by over 35 percent in the last 25 years, saving the equivalent of **71 bil-**

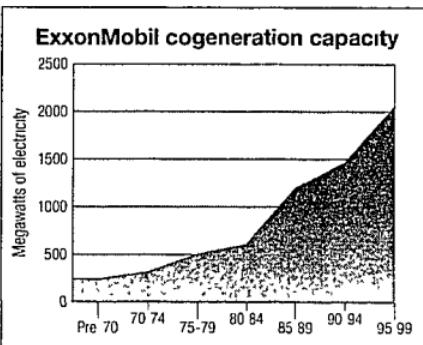
**lion** gallons of oil.

And we continue to do more. Prodigious amounts of electricity and steam are needed to process crude. One solution is to build cogeneration plants, which use very efficient gas turbines to simultaneously produce electricity and steam. This process requires 30 percent less energy than conventional approaches. We already have cogeneration facilities at 27 locations worldwide, with more planned. As shown in the nearby chart, these facilities produce over 2,000 megawatts of electricity, equivalent to the residential needs of 3 million people.

Of course, the vast majority of emissions generated by petroleum occur when consumers use the products.

Reflecting this, we have formed strategic technology partnerships with major automobile companies. Joint efforts include initiatives focusing on advanced diesel and gasoline engines with improved fuel mileage, new lubricants for greater engine efficiency and lower emissions, and technology that will allow future fuel cell vehicles to use gasoline and achieve twice the fuel economy of current vehicles.

There is much more being done, of course, in all areas of our business, from exploration and production to individual service stations. This path—the conservation and efficient use of energy through market forces and new technology—requires no mandates or complex international agreements. But the payoff of this approach is a boon to consumers, companies and the environment alike.



## ExxonMobil™

# 22-cv-01550-MAJ Document 4-4 Filed 11/23/22 Page 70 A Bull Market with a China Shop

Toward the end of last year, negotiators from Washington and Beijing nailed down a historic agreement that would—after 14 years of negotiations—go a long way toward making China a member of the World Trade Organization (WTO), currently 133 nations strong. Before American workers and companies can benefit from China's playing by WTO's rules, Congress must approve Permanent Normal Trade Relations (PNTR) status with China.

This is an opportunity not to be denied. China's integration into the world economy calls for this nation of more than one billion potential consumers to open its markets, eliminate trade barriers and implement comprehensive trade and investment reforms. Those looking to extend America's bull market and record growth can help by supporting PNTR and giving America's manufacturing and agricultural industries—and their workers—access to huge new markets.

By granting China PNTR status, Congress would in essence be extending the status quo, since China has annually been granted Normal Trade Relations status under U.S. law on an annual basis since 1980. By approving this status, the U.S. government would put an end to what has become a frequently divisive annual procedure and would help to get U.S.-China relations back on an even keel.

China's entry into the WTO will benefit both sides. For the U.S. it means expanded market access for a broad range of U.S. exports, including agricultural products, information technology and automobiles as well as for service sectors like telecommunications, banking, and insurance. As

we have seen in more than a century of international operations, trade is more than providing and selling quality products at a competitive price. It also brings countries and people closer together through the exchange of ideas and values and through the promotion of a greater appreciation of cultural differences. So it has been with China. Even under the present limited structure, America's trade relations with China have produced changes that have encouraged economic freedom, private enterprise, access to information and a higher standard of living. We believe engagement enhances the cause of human rights far more than political isolation.

For China, entry into the WTO will reinforce these gains. Recent history has shown that an expanding global economy can tear down walls, as it did in Berlin. We are also convinced it can have an impact on that nation's policies, politics and performance on the world stage. We believe China's membership in the WTO will hasten domestic economic reform and strengthen the rule of law in that nation while building a more resilient country able to contribute to regional stability and economic growth. It will also bolster China's relations with its neighbors and thus advance the security and prosperity of the Asia-Pacific region.

We urge Congress to give priority to granting China PNTR status with the U.S. The leaders of our two nations, understanding the importance of this agreement in stabilizing U.S.-China relations as well as the future of the global economy, have set aside short-term political expediency and decided instead for progress and change. We hope you will support Congress in doing so, too.



# Generating heat

Sometimes when the weather grows cold, a lot of heat is generated, but not always in a constructive way. This is especially true in the burgeoning dialogue about higher heating oil prices and what can be done about them.

The answers are not as easy as some would think. Before proposing answers, however, the problem should be understood. Fortunately, that's not so difficult.

We live in a free market economy in which the balance between supply and demand determines prices for any particular product or service. One Babe Ruth in today's world would be worth many millions of dollars. One hundred Babes, on an individual basis, would be valued somewhat lower. So it is with oil. Early in 1999 there was a surplus of crude oil produced around the world, and oil prices, when inflation was factored in, were at levels not seen since the Great Depression.

Several things have happened since the beginning of last year:

- The Organization of Petroleum Exporting Countries (OPEC) decided to inaugurate production cuts to limit the oversupply.
- The previously stagnant economies in Asia and Europe began to grow, creating increased demand for crude oil to fuel their increasing manufacturing output.
- The healthy U.S. economy continued to expand, further increasing demand for energy from petroleum.

As a result, crude oil prices have doubled over the course of the year. That in itself would have been enough to increase home heating oil prices. When the weather turned suddenly colder, however, another factor was added to the mix — greatly increased demand for heating oil.

Moreover, some "interruptible" customers in

the Northeast, who usually use natural gas, are switched over to heating oil as demand for natural gas increases in cold weather. This, too, increased demand for heating oil. Finally, the extremely cold weather has played havoc with deliveries by truck and barge, causing short supplies at some terminals. All of these factors have caused home heating oil prices to increase.

These prices have caused hardship on consumers living in low- or fixed-income households. We strongly support President Clinton's decision to release funds from the Low Income Home Energy Assistance Program to ease their financial strain. This program — designed to provide financial assistance to those needing it — is the proper way to handle market changes and a far superior alternative to proposals in other government circles that will distort the market.

There are some groups, for example, who have called for releasing crude oil supplies from the Strategic Petroleum Reserve (SPR), either in a direct sale or through "swaps" in which companies would take SPR oil now and return an equal amount later.

Though well meaning, one flaw with these ideas is that the SPR was not designed to balance short-term petroleum supply or market fluctuations. The SPR is designed to be available in major supply emergencies when our national security and economic prosperity are at stake.

Furthermore, little can be gained in the way of meaningful supply and by the time supplies were released, transported, refined and delivered, the winter likely will be over.

With an aid program in place for consumers needing financial help, government should let the market do the rest of the job. It is, after all, a far superior mechanism for determining supply and demand decisions.

# Making gasoline from tar

No whistles, no bells, no cheers welcomed a shipload of extra-heavy Venezuelan crude oil that arrived recently at a refinery in Louisiana, where the tar-like petroleum is converted to clean-burning gasoline.

Maybe someone should have blown a horn ..or done something to celebrate. Lesser events have been certainly accompanied by more hoopla.

It has been 40 years since the oil was discovered, and it took numerous technological advancements to economically and efficiently produce and deliver it for refinement. What took so long? A couple of things

This energy-rich heavy oil starts to harden soon after it's pumped from deep in the earth, where it's been simmering for millions of years at about 130 degrees Fahrenheit. Once this oil reaches cooler temperatures at the surface, it gets as thick as good homemade jelly, and it won't flow through the pipelines at Venezuela's big Cerro Negro field.

American, German and Venezuelan engineers overcame this problem by diluting the thick oil with lightweight oil. This careful blend of light and heavy oils flows through a 180-mile-long pipeline to export facilities on Venezuela's north coast.

By next year a processing plant at the port will upgrade Cerro Negro's heavy crude to a lighter oil for shipment to Germany and the United States. Production will then double to about 120,000 barrels of oil a day.

Some pretty sophisticated technology will process the oil at refineries in the United States and Germany that are jointly owned by a

Venezuelan oil company and its respective German and American partners.

Heavy crude oil similar to Cerro Negro's makes up about 15 percent of the world's remaining oil resources. The technology to produce it, transport it and refine it opens up similar energy resources in geographically diverse regions of the world. This adds up to a more secure supply of energy for global markets.

Thanks to new technology, Cerro Negro's estimated 1.5 billion barrels of oil can now be produced. Three-dimensional seismic "pictures" show drillers where to aim their drill bits. By drilling wells horizontally across sections of this heavy oil, producers extract much more oil from one well than they could by drilling straight down.

Specially designed pumps produce better than 2,000 barrels of oil a day from each of these wells. That's the highest rate of heavy oil production in the world.

None of this was feasible with the technology available 40 years ago, when the Cerro Negro resource was discovered.

The project has created 5,000 local construction jobs. For at least another generation, Cerro Negro will train workers, provide maintenance and construction jobs, and purchase local goods and services, all of which should be a boon to neighboring communities.

Exxon Mobil Corporation's Venezuelan affiliate has a 41 percent interest in Cerro Negro, in association with Venezuelan-owned Petroleos de Venezuela and German-owned Veba Oel AG. Even if we didn't toot our horns about a shipload of oil, we think turning tar into gasoline is something to write home about.

# Resolutions for the new century

The people of Exxon and Mobil spent most of the last century getting ready for the next one. As the sun was setting on the 1900s, Exxon and Mobil merged their talents, their technology, their assets and their standards.

Together we're better—better prepared to meet the world's rising demand for energy. Together, we make these resolutions for today, tomorrow and the 21st century:

- Foremost, we resolve to run every aspect of our business with integrity.
- In our operations—safety, security and exacting management practices are paramount.
- In our financial dealings—we will adhere to strict controls and straightforward, transparent dealings.
- As a good corporate citizen—we will act in accordance with all applicable laws, scrupulously and ethically.
- As a responsible neighbor—we will demonstrate respect for the earth and the communities where we operate.
- We will have forthright, inclusive, trusting and open dealings with everyone—our employees, contractors, customers and suppliers.

In our pursuit of excellence, we resolve to develop and apply innovative technology. Our research and development will give us the competitive edge essential to grow our businesses efficiently. That's what we've done for the past 100 years.

At the onset of the last century, no one envisioned drilling for oil in ocean waters two miles deep. No one envisioned the world of plastics from petrochemicals, an industry we invented. No one envisioned the technology of *Speedpass*™—the easiest, most convenient way to buy fuel at the pump—or the advantages of synthetic motor oils. And no one envisioned fuel cells that promise to power everything from cars and trucks to homes and hospitals.

We are driven by a desire to promote and reflect the best possible science, economics and understanding of public policy issues. We base our decisions on fact, not speculation, and advocate the same for society. We have a right and an obligation to speak out and we'll do so speedily, frankly and at times boldly.

Our vision and future direction are clear. America and countries throughout the world need energy. Economic progress depends on increasing the availability of affordable and reliable sources of energy.

We know that economic progress carries responsibilities—to our customers, to the communities where we work, to our shareholders and our employees, as well as to the environment. The new ExxonMobil will continue to deliver fossil fuels and petrochemicals that are economically efficient and environmentally sound.

Integrity in every aspect of our business is

**ExxonMobil**

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RICO Statement Exhibit\_314

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# The promise of hybrids

Increase and reduce. These have been the dual goals of the automotive and oil industries as they have worked for decades to increase fuel mileage while reducing vehicle emissions. And progress has been enormous. Today's new cars get twice the fuel economy with one-tenth the emissions of cars in 1974.

The next step may be a new kind of car — the hybrid.

We call these vehicles hybrids because they combine two sources of power: an electric motor to boost horsepower during acceleration and a small, high-efficiency gasoline

engine for steady speeds. The engine recharges the car's suitcase-size battery as you drive. That battery also gets a boost each time you apply the brakes, using a technology known as regenerative braking.

Major benefits are higher mileage and very low emissions. Also, hybrids produce only about half the carbon dioxide of most new cars.

Hybrids made their North American debut in January 2000 with the introduction of the Honda *Insight*, a light 2-seater that can get up to 70 miles per gallon (mpg) on the highway. Toyota's 4-door *Prius*, the first commercial hybrid when it was introduced in Japan in 1998, will be available here this summer.

Toyota has sold more than 30,000 of its *Prius* model since it was introduced in Japan. In the United States, Honda plans to produce

6,500 *Insights* this year.

Of course, predicting vehicle success and broad consumer acceptance is difficult, especially since hybrids must compete with continual improvements in existing automobiles, and in the future with cars powered by fuel cells.

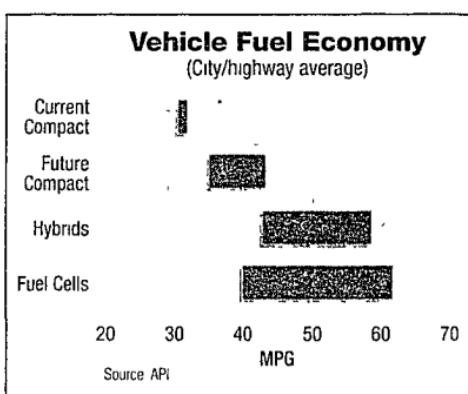
Hybrids have many of the localized emissions benefits of all-electric vehicles, but because hybrids use gasoline, they have greater range, plenty of places to refuel, and drivers don't have to wait for them to recharge.

One disadvantage of hybrids is the current high cost of manufacturing.

ing. While this is not unique for a new technology, it will take broad consumer acceptance to increase production enough to reduce costs.

And for now, there are not a lot of hybrid vehicles to choose from. This may change. A number of the world's major vehicle manufacturers are actively engaged in the development of hybrid systems. It will take this greater range of models, experience in operation, as well as the reductions in production costs before market success is possible.

If hybrids can eventually provide the package of price, performance and other attributes consumers want, they may turn out to be acceptable alternatives to many of today's vehicles. They are promising, and we support the technology as an encouraging step toward greater energy efficiency and cleaner air.



**ExxonMobil**

# Do No Harm

Just as changeable as your local weather forecast, views on the climate change debate range from seeing the issue as serious or trivial, and from seeing the possible future impacts as harmful or beneficial.

Some in the debate believe they can predict changes in climate decades from now. Advocating "precaution," and despite scientific uncertainty, they believe actions should be taken immediately to reduce carbon dioxide emissions by mandating severe restrictions on energy use.

Though we wholly support the efficient use of fuel, a prudent approach to the climate issue must recognize that there is not enough information to justify harming economies and forcing the world's population to endure unwarranted lifestyle changes by dramatically reducing the use of energy now.

Enough is known about climate change to recognize it may pose a legitimate long-term risk, and that more needs to be learned about it. Many scientists and economists believe that it is inappropriate to impose costly policies such as the Kyoto Protocol—the result of a 1997 negotiation by governments to reduce greenhouse gas emissions only in certain countries.

In the United States, the Department of Energy has estimated that the Kyoto Protocol would require a dramatic (30 percent) near-term reduction in the projected use of energy. Most economists tell us that such a step would damage our economy and almost certainly require large increases in taxes on gas and oil. It could also entail

enormous transfers of wealth to other countries.

Even if it were implemented, the Protocol would not accomplish what it is supposed to do—reduce the global buildup of greenhouse gases. Why? Because the Kyoto Protocol does not restrict emissions in developing countries. These countries, which are growing rapidly, desperately need energy to improve the welfare of their people. They have not agreed to limit their energy use and could not do so without undermining growth.

Moreover, for most nations the Kyoto Protocol would require extensive diversion of human and financial resources away from more immediate and pressing needs in health care, education, infrastructure, and, yes, the environment—all critical to the well-being of future generations.

We support and are undertaking feasible and affordable ways to voluntarily use less energy today. In addition, we propose an approach that continues a strong focus on scientific understanding, carefully evaluates the costs and benefits of policies, and promotes research and development of technical options that have the potential to make significant longer-term reductions in emissions, if they are needed. Over the next few weeks, we'll discuss these proposals in more detail.

Although it is hard to predict what the weather is going to be this weekend, we know with certainty that climate change policies, unless properly formulated, will restrict life itself.



# Unsettled Science

Knowing that weather forecasts are reliable for a few days at best, we should recognize the enormous challenge facing scientists seeking to predict climate change and its impact over the next century. In spite of everyone's desire for clear answers, it is not surprising that fundamental gaps in knowledge leave scientists unable to make reliable predictions about future changes.

A recent report from the National Research Council (NRC) raises important issues, including these still-unanswered questions: (1) Has human activity already begun to change temperature and the climate, and (2) How significant will future change be?

The NRC report confirms that Earth's surface temperature has risen by about 1 degree Fahrenheit over the past 150 years. Some use this result to claim that humans are causing global warming, and they point to storms or floods to say that dangerous impacts are already under way. Yet scientists remain unable to confirm either contention.

Geological evidence indicates that climate and greenhouse gas levels experience significant natural variability for reasons having nothing to do with human activity. Historical records and current scientific evidence show that Europe and North America experienced a *medieval warm period* one thousand years ago, followed centuries later by a *little ice age*. The geological record shows even larger changes throughout Earth's history. Against this backdrop of large, poorly understood natural variability, it is impossible for scientists to attribute the recent small surface temperature increase to human causes.

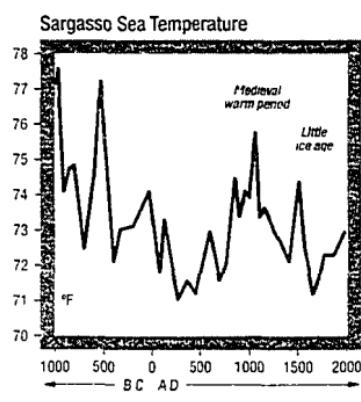
Moreover, computer models relied upon by climate scientists predict that lower atmospheric temperatures will rise as fast as or faster than temperatures at the surface. However, only within the last 20 years have reliable global measurements of temperatures in the lower atmosphere been available through the use of satellite technology. These measurements show little if any warming.

Even less is known about the potential positive or negative impacts of climate change. In fact, many academic studies and field experiments have demonstrated that increased levels of carbon dioxide can promote crop and forest growth.

So, while some argue that the science debate is settled and governments should focus only on near-term policies—that is empty rhetoric. Inevitably, future scientific research will help us understand how human actions and natural climate change may affect the world and will help determine what actions may be desirable to address the long-term.

Science has given us enough information to know that climate changes may pose long-term risks. Natural variability and human activity may lead to climate change that could be significant and perhaps both positive and negative. Consequently, people, companies and governments should take responsible actions now to address the issue.

One essential step is to encourage development of lower-emission technologies to meet our future needs for energy. We'll next look at the promise of technology and what is being done today.



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# The Promise of Technology

One of the brighter hopes in the climate change debate has to be the benefits to be achieved through technology. For a world that has conquered polio and put a man on the moon, that's no empty promise. Modern technology makes it possible for many to enjoy a way of life far beyond the dreams of previous generations. Engineering ability and entrepreneurial vision give us confidence that technological progress will accelerate through the 21st century. Future advances are likely to meet individual expectations for greater prosperity and also the environmental and social challenges we face.

Many respected economists conclude that research to develop new technology offers the most effective near-term means to address the long-term response to climate change. Corporations, universities and government laboratories are studying technologies that offer the possibility of supplying and utilizing energy with far lower emissions. Later this year, for example, the Business Roundtable, an association of over 160 of the largest U.S. companies, will host a national summit focusing on such technology.

Energy companies are working with large automobile manufacturers on fuel-cell-powered vehicles, hybrid (gasoline plus electric) cars, and systems for advanced fuels and vehicles. Other opportunities include more-efficient power generation, renewable and alternative energy, and methods to separate and dispose of greenhouse gas emissions during fossil fuel

combustion. Many companies work continuously on programs to improve energy efficiency in manufacturing and to supply more-efficient products to their customers.

Although the potential of technology is significant, everyone offering solutions to environmental challenges should bear two cautions in mind.

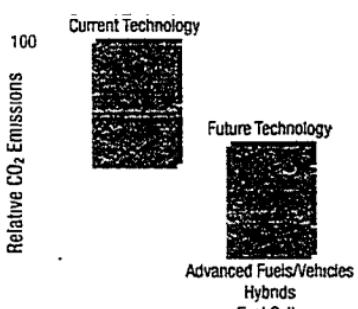
First, research on promising projects does not always succeed commercially. For consumers to accept new technology, it must meet many demands, including affordability, performance, safety and environmental impacts, among others. In short, markets—not politicians—will inevitably decide which products are successful.

Second, new technology requires time to develop and deploy. Consequently, even when a technology proves that it can work and is cost-effective, it may take years for its use to become widespread. Moreover, to address climate change, new technologies

must spread over the entire globe. We cannot pursue high-cost options just for the developed world. To affect global emissions, technology must be affordable everywhere.

Climate change may pose legitimate long-term risks. As one of the world's leading science and technology organizations, ExxonMobil is confident that technology will reduce the potential risks posed by climate change. But we also know it takes time to discover, develop and deploy affordable technologies for world markets. That's why we're working on long-term solutions now.

## Reducing Vehicle CO<sub>2</sub> Emissions



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# The big push for natural gas

As public debate has been increasingly directed to the need for a long-range U.S. energy policy, the important role of natural gas has been overshadowed by the focus on conservation and renewables. But the policies that affect natural gas deserve special attention.

Natural gas provides about 23 percent of our nation's energy, and demand for this environmentally clean fuel is growing twice as fast as other conventional energy sources. The Department of Energy expects natural gas use to increase almost 50 percent in the next 20 years (see the accompanying chart). Supplying this significant increment of energy will be a major challenge.

Natural gas is increasingly found in homes, where it offers convenience for cooking and heating. It is also the fuel of choice for new electricity generation, another rapidly growing energy source that is now recognized to be of central importance for the "new economy." High-technology combined-cycle gas-fired power plants are extremely efficient and meet air emission targets at lower cost than competing technologies.

A lot of natural gas is available close to home. Almost 90 percent of the natural gas consumed in the U.S. is produced domestically, with the bulk of the remainder coming via pipeline from Canada. Some additional gas is imported in liquified form.

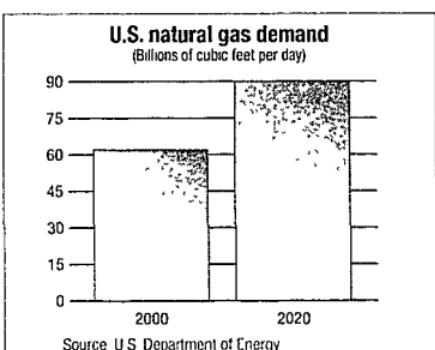
However, the domestic resource base contains proven reserves sufficient for only 7 years at current consumption rates. Fortunately,

there are significant additional reserves in both the U.S. and Canada. Developing these non-proven reserves will require very large investments by industry and favorable government policies on access to resources.

The National Petroleum Council has estimated that producers will have to invest over \$600 billion by 2015 to meet future demand. ExxonMobil has been doing our part. Early this year we started up a \$2 billion project to bring substantial new natural gas supplies to New England from the Sable offshore project in Canada.

In May, we began production of over 200 million cubic feet a day of gas from the \$1.6 billion Hoover-Diana development in the Gulf of Mexico. We've also increased gas production in West and South Texas and in Alberta, Canada.

Much more will be needed. Northern Alaska and the Arctic regions of Canada hold significant reserves that are being carefully assessed for economic and environmentally safe development. Increased imports of liquified natural gas are likely to be required. There are also substantial reserves in areas offshore and in parts of the Rocky Mountain region that will be available only if governmental policies on access are changed. All these resources can be developed safely and will benefit both the environment and U.S. security. But what is needed is a long-range energy policy that encourages the development of resources here and abroad to satisfy our nation's need for this premium fuel.



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# Energy and the environment in developing countries

As people in developing countries go through the process of modernization, the environment and people's health are affected in many ways. Despite charges by opponents of growth, many of the changes are positive.

Now we don't want to minimize the challenges that arise when poor countries grow and inevitably affect the environment. But let's look at the energy sector to get some idea of the dynamics.

People in the poorest countries have the same basic needs as people anywhere. But being poor, they do not have all the energy choices. So they often cut down local forests to have fuel for cooking and heating. Where wood is scarce, they use animal waste. They may also use locally mined coal in open stoves and crude furnaces. They pay a cost for these fuels in poorer health from smoke, soot and waste-borne disease.

As incomes grow, petroleum fuels become available and choices improve. Petroleum fuels are usually cleaner burning, much easier to obtain and handle, and allow agricultural productivity to grow. With them, there is much less need to cut down forests for fuel or for additional agricultural land. Look at the chart, and notice that deforestation declines as countries become wealthier. In the most advanced countries, forests are even expanding.

There is no doubt that health also improves with income growth. Targeted health programs are essential to producing these

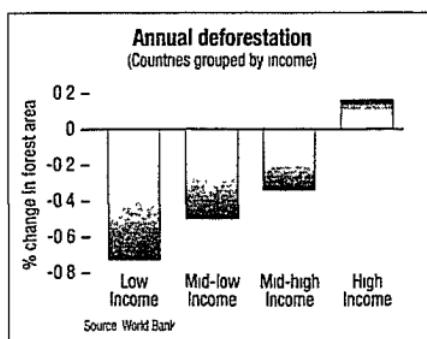
improvements, especially in countries ravaged by malaria or AIDS. But another reason health improves is that the energy used is cleaner. For example, according to the World Health Organization, more than *four million* children die each year in the developing world from respiratory infections, a substantial portion of which are caused by indoor inhalation of smoke and soot from non-oil fuels.

We also know that developed societies are able to provide both growth and environmental improvement. While the U.S. economy has more than doubled since 1970, sulfur dioxide, carbon monoxide, lead and volatile organic compound emissions have all

declined substantially.

The good news is that developing countries will not have to reach a U.S. level of income before they begin to see improvements such as low-emission automobiles and fuels, factories and power plants. As long as countries allow international trade and investment flows, the low-pollution technologies available in rich countries are available to the developing world. For example, the expanded ExxonMobil refinery in Thailand uses advanced sulfur reduction technologies found in the U.S. today, even though the income level of Thailand is less than half that of the U.S. in 1900.

There is still much to learn about minimizing the environmental impact of development. But this is a challenge that is being addressed every day and with increasing optimism.



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# The Third Branch

Of the many men and women for whom Americans will vote this year, the least visible are those who would serve as state judges

Throughout American history, state judges have made decisions affecting life and death, personal freedom, public safety, the ability of people to make a living, and the constitutional rules that govern our society. Today, using "innovative" liability lawsuits, aggressive trial attorneys and some state officials are calling upon the judicial process to accomplish social and political goals that have always before been handled by state legislation and executive-branch regulation

Whatever the wisdom of this new trend, it does mean that the judiciary has become even more central to individuals and to political and business life. And more than ever, we need to have qualified and impartial judges

Today, nine states select judges through partisan elections, thirteen through nonpartisan elections, and the rest through gubernatorial and legislative appointment. The election of judges has become controversial, since judicial campaigns are attracting large political contributions from attorneys who appear before the court

Where judges are elected, voters may find it difficult to learn about the records and views of judicial candidates. Many voters decide not to vote for someone about whom they know nothing. This problem is compounded in major metropolitan areas, where many judicial posi-

tions may be on the ballot.

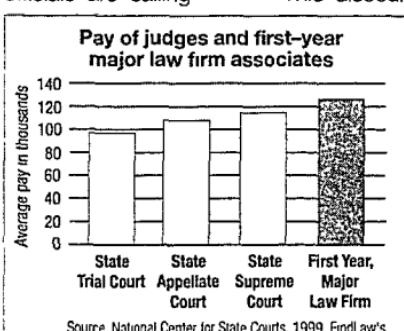
The pay of judges has also become a problem. As the accompanying chart shows, the reported starting salaries for some students just graduating from law school can be **higher** than the average pay for state judges. A law firm partner will make much more than a judge, and top plaintiff attorneys are receiving tens and even hundreds of millions of dollars.

This discourages many qualified lawyers from becoming judges and causes some judges to leave the bench

With these issues, what can be done to maintain the impartiality and quality of the judiciary?

We believe the selection of judges should be better insulated from special interests, under

both election and appointment systems. Properly designed *merit selection* systems would help erase the perception that special interests influence judicial decisions. The public should have ready access to judicial records and qualifications, and where judges are appointed, citizens should have the right to remove them through retention elections. Public service groups could do more to help explain the positions and records of judicial candidates. Pay should be higher, so that being a judge can better compete with private practice. And, finally, there should be a renewed constitutional debate about the scope of judicial decisions, particularly where the judiciary is used as an "end-around" the state legislature and executive branch



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# Unbalanced caution

Better safe than sorry. This proverb is the essence of the precautionary principle, which has become a central element of several recent international agreements, and of policies announced by the Environmental Protection Agency and the European Union.

While there is no official definition of the precautionary principle, the one expressed in the 1992 Rio Declaration is the most commonly cited: *Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.*

On the face of it, this is a reasonable principle. Business and government share a common goal to exercise appropriate caution to ensure that new products and business operations do not pose unwarranted risks to public health or the environment. Where risks to public health or the environment exist, cost-effective steps to manage and reduce these risks should be taken.

Unfortunately, using highly speculative assertions of risk, some activists misuse the precautionary principle to justify product bans and to stop new developments, including those that hold enormous promise for improving human life. Despite the absence of meaningful scientific evidence, claims of serious potential harm are made, even in the face of experience with the safe use of targeted products. Some types of plastics, genetically modified grains, hormone-treated meat and even routine energy projects are opposed because they are seen as too risky. Trade protectionists also use the princi-

ple as an excuse to ban new products that compete with traditionally protected goods.

Misuse of the precautionary principle should be cause for concern. In practice, advocates are now demanding the impossible by insisting on perfect certainty of no ill effects. A responsible approach to risk recognizes that all human activities include both benefits and risks. Electricity, air travel, and chemotherapy all entail

risks, but on balance society recognizes that their benefits justify facing their associated risks (even while working to reduce these risks further).

If the precautionary principle is used to block beneficial innovations, pub-

lic welfare is damaged. An unbalanced and excessive caution can undermine economies, jobs, human aspirations, health and the environment. Unjustified fears can lead to counterproductive behavior (as, for example, when consumers avoid eating fruit because of the exaggerated fear of residual agricultural pesticides). Trade restrictions arising from the misuse of the principle strain international relations and hurt consumers and producers.

Enormous benefits come from scientific research, innovative technology and new developments. That is why governments must avoid the utopian pursuit of a risk-free world and, instead, exercise common sense in applying the precautionary principle. Above all, we should rely on science-based risk assessment and management, recognize the potential benefits that new developments entail, and use the scientific tools society has to seek both greater safety and material progress.

The ExxonMobil logo consists of the company name in a bold, sans-serif font. The 'X' is stylized with a diagonal line through it, and 'Mobil' is written in a smaller font below 'Exxon'. A registered trademark symbol (TM) is located at the top right of the 'il' in 'Mobil'.

RICO Statement Exhibit\_322

## Globalization and developing countries: II

# On the side of the tide

Is economic growth a rising tide that lifts all boats, or do benefits of growth only meagerly trickle down to those at the bottom of the economic heap? Recent research comes down firmly on the side of the tide. While antigrowth activists argue that free trade, investment, and economic stabilization policies harm the poor of the world, the evidence tells quite a different story.

In a recent paper, *Growth Is Good for the Poor*, the World Bank looks at average per capita income growth and the income of the poorest income group. Using a new database covering 80 countries and four decades, the bank finds that incomes of the bottom 20 percent—the poor—move in tandem with average country incomes. Incomes of the poor move with those of the general population in both rich and poor countries, in good times and bad, in recent years as well as in the past.

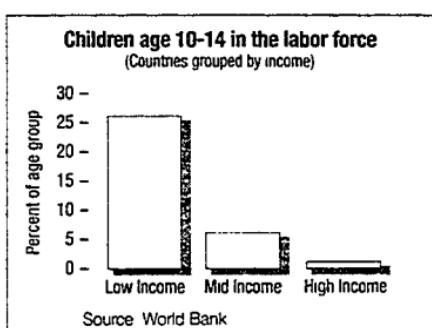
Other myths also crumble in the face of actual data. Do low inflation policies benefit the rich at the expense of the poor? No. This myth is doubly wrong. Avoiding high inflation helps the poor more than it helps the general population.

Let's put it in bold **pro-growth policies help the poor.**

Economic growth can lift real income for everyone, not just business or the wealthy. However, what does make income differences

wider are factors such as poor health, low levels of education, and ineffective legal institutions. These are legitimate concerns that need to be attacked by targeted policies—but not by attacking economic growth, open markets and trade.

One direct beneficiary of economic growth is children. Look at the accompanying chart. World Bank data shows that the share of



10- to 14-year-olds in the labor force declines dramatically as national incomes rise. This is a tangible benefit for the poor, whose children must often work to help meet family needs. Children freed from work can obtain first an education and then a better future.

What this means for economic policy is that pro-growth policies related to investment, international trade, education, stable prices and the rule of law belong in the toolbox of anyone truly interested in the social and economic well-being of nations.

International companies such as ExxonMobil also have a central role to play in extending the benefits of globalization to many people, including but not limited to our shareholders. As we work in Azerbaijan and Angola, China and Chad, Thailand and Trinidad, we help bring growth and we help transfer best practices in areas such as employee training, labor relations and health care. And with these, we now know, the poor rise with the rest.

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# Sanctions with gums

Quick quiz: Against which one country among all those that emerged from the Soviet Union does the United States maintain sanctions?

The answer is Azerbaijan, population eight million, a strategically important country with rich natural resources located between Russia and Iran.

Azerbaijan has been involved in an ethnic conflict with Armenia over an area called Nagorno-Karabakh. The unresolved conflict has resulted in large numbers of refugees on both sides, including one million Azerbaijanis. Since 1992, U.S. legislation has prohibited official aid to Azerbaijan for its refusal to trade with Armenia.

The Nagorno-Karabakh issue is complex and we do not wish to take sides. But on the sanctions question we do have a view — they should be abolished.

First, the sanctions are utterly ineffective. No other western nation limits dealings with Azerbaijan. Private companies are under no restrictions when trading or investing in that country.

Second, a ceasefire has been in place since 1994, and peace negotiations have been underway for several years. The U.S. tries to play the role of an honest broker in these negotiations, but is hampered by the stigma of the sanctions. Both the Bush and Clinton administrations argued that the legislation was unfair and hindered the peace effort. In the past few years, Congress has allowed some forms of official assistance, but direct humanitarian aid to the million refugees remains off limits.

Furthermore, Azerbaijan has been the

focus of attention as a source of energy and as a conduit for the transportation of oil and gas being developed in the region. These are important resources to meet growing world energy demand, increase the diversity of energy supplies and help the Azeri people. The Nagorno-Karabakh conflict complicates rapid development of these resources.

U.S. interests are best served by a stable environment in this region for positive political and economic growth and for the development and transportation of important natural resources. Because unilateral sanctions undermine this effort and impede the resolution of the Nagorno-Karabakh conflict, the Congress should repeal them, or the Clinton Administration should use its statutory authority to lift them.

Azerbaijan faces difficult challenges in both its political and economic development.

Additional U.S. assistance would help improve the prospects for further democratization, legal and regulatory reform, and alleviation of poverty. Regional coordination of energy development, environmental protection of the Caspian Sea, and multiple oil and gas pipeline projects would all be advanced by a supportive U.S. role. But achieving these goals is compromised by sanctions.

The U.S. government is in the position of maintaining toothless sanctions that manage only to gum up our foreign policy interests. The visit to Washington this week of Azerbaijan's president, Heydar Aliyev, presents an opportunity to reconsider the sanctions and do what is sensible. End them.



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# Moving past Kyoto...

Recent statements by the Bush administration on the Kyoto Protocol, climate change and regulation of CO<sub>2</sub> provide new realism on these serious issues. The protocol ineffectively addresses the long-term risks of climate change, yet its obligations would impose dramatic economic costs throughout the developed world, particularly the United States. It is essential to move to more practical and politically attainable approaches that recognize the need for affordable energy in our daily lives.

The inability of governments to reach agreement on the protocol last November in The Hague highlights the protocol's fundamental flaws. Leading the list is the growing recognition that most governments cannot meet the politically chosen targets without resorting to economy-wrecking measures. Fine-tuning the targets and timetables, as some recommend, cannot save Kyoto. An understanding of Kyoto's problems is important if we are to develop truly effective approaches to managing the risks of climate change:

**Kyoto was too much too soon.** Its initial carbon targets would require massive reductions in energy use within a few years, with further substantial reductions to follow. Political goals were set without a sober assessment of economic and technical realities or public toleration of major lifestyle changes. This was reckless given the central role played by energy in all economies.

**It tried to force technological change** without a realistic appraisal of the long time frames needed for new technologies to succeed in the marketplace and gain worldwide acceptance.

**Kyoto failed to include developing countries** in its commitments. Since most energy growth will occur there, the protocol would do little to reduce global greenhouse gas emissions. Yet poorer countries need more energy if they are to provide economic growth and a better life for their people.

**Kyoto required a vast global regulatory regime** that would be implemented using untried policies through new and extensive international and national bureaucracies. Negotiations revealed the likelihood of serious unintended consequences from the complex procedures being formulated to manage global carbon emissions.

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## More practical and politically attain- able approaches are needed.

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**Kyoto was fatally politicized.** Activists closed off important options (such as hydropower, advanced coal technology, nuclear energy and carbon sinks) based on ideological intransigence. Scientifically unfounded scare scenarios were and continue to be promoted in an effort to justify the protocol.

The stalemate in The Hague and a new administration in Washington provide an opportunity to develop a sounder approach.

Without ignoring the seriousness of the issue, it is time to move beyond Kyoto and to focus on more effective steps to manage the long-term risk of climate change. These include technology research and development, science that addresses fundamental gaps, economically based voluntary actions and an international approach that meets the aspirations of all the world's people.

We elaborate on these points in the space nearby.

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# ...to a sounder climate policy

Most people acknowledge that human-induced climate change is a long-term risk. And it is by now becoming better understood that the Kyoto Protocol approach would be a serious mistake. But if not Kyoto, what?

Central to any future policy should be the understanding that man-made greenhouse gas emissions arise from essential energy use in the everyday activities of people, governments and businesses. Consequently, efforts to control emissions have important economic and social consequences. In our view, the most effective way to respond to all concerns and risks is through programs that encourage *economically justified near-term actions*, and that promote *climate understanding and technological innovation for long-term solutions*

Here are some concrete proposals

**Encourage voluntary actions.** These would include management systems for energy efficiency, cost-effective investments such as co-generation in manufacturing and energy efficiency in businesses and homes. These suggestions are much more than empty words. In ExxonMobil's case, we have installed over 2000 megawatts of cogeneration capacity, which typically reduces energy use by 30 percent

**Promote carbon storage** through protection and expansion of forests and emphasis on soil management, such as no-till agriculture.

**Focus international efforts on a framework that supports technology transfer and information sharing.** Encouraging open markets, freer investment flows and protection of intellectual property embodied in technology would accelerate the commercialization and global spread of energy-efficient technologies

**Conduct scientific research** to improve society's ability to predict possible consequences (positive as well as negative) of future climate change. Programs should concentrate on factors that seriously limit current understanding. These include the effects of clouds, aerosols, sea ice, deep-ocean circulation, hydrology and natural climate variability. We also need to improve the monitoring of climate

**Realistically appraise** and address barriers to renewable energy (wind, solar) and nuclear energy

Although each has potential to help meet energy demand without adding to greenhouse emissions, they face serious technical, marketplace and political barriers.

**Undertake research on promising long-term technological options.** For example, we are involved with automobile companies in joint research that could significantly reduce future emissions by using fuel cells powered by hydrogen from advanced gasoline. Other possibilities include clean-coal technology for electricity generation, separation and storage of CO<sub>2</sub> emissions; and geoengineering to remove carbon dioxide directly from the atmosphere.

These suggestions share some common characteristics. They are designed to include practical near-term steps, while at the same time they encourage the development of long-term technical solutions. They avoid regulatory strait-jackets and invite participation by all nations. Because they are flexible, policies can change as experience and knowledge are gained.

This approach also offers the opportunity for all companies, the scientific community and governments to work together on a climate policy that makes sense for the future.

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RICO Statement Exhibit\_326

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# Resurgence of a killer

Two a minute. One million a year. That many people die from malaria, a mosquito-borne disease that has dramatically increased in the last twenty years.

Malaria is devastating and debilitating. Forty percent of the world's people live with the risk of contracting it. Estimated cases range from 300 to 500 million. Ninety percent of the deaths occur in Africa south of the Sahara, where one in five young children who die, die from malaria.

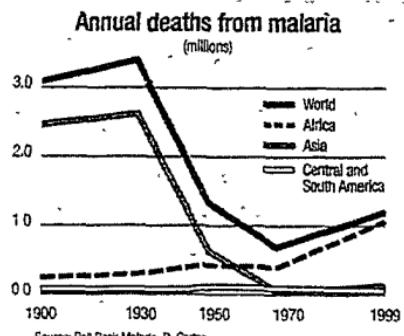
In the first half of the 20th century, malaria was even more widespread, extending into Europe and the United States. The Global Malaria Eradication Campaign began after World War II, making widespread use of DDT to kill or repel the mosquitoes that carry the malaria parasite, and new drugs to treat the disease. The results were extraordinary. Malaria was eradicated in the US in the 1950s. It was gone from all developed countries as well as large areas of tropical Asia and Latin America by the mid-1960s. Only in Africa, where eradication efforts were limited, did the disease maintain its sway.

But malaria has now rebounded in many areas of the developing world. Important factors behind this rebound include population growth and movement, deteriorating public health systems, poor housing conditions, and altered land use. Other elements have been the reduction in the use of DDT and the increase in resistance of some malaria strains to current antimalarial drugs.

Research at Harvard and elsewhere has

shown that malaria so debilitates its victims that it severely limits economic growth. Some countries may never be able to advance unless they can control this disease.

The resurgence of malaria, the knowledge that it is preventable and curable, and the huge costs and suffering it imposes have galvanized several organizations to take action. The spearhead for the fight is the Roll Back Malaria movement, launched by the World



Source: Roll Back Malaria, R. Carter

Health Organization together with the governments of several malaria-affected countries, the UN Development Program, UNICEF (UN Children's Fund), and the World Bank. Through country and local community partnerships it promotes such measures as the use of insecticide-impregnated bed nets and new technologies and medicines to control and treat malaria.

Private groups are also playing a role. ExxonMobil is supporting Roll Back Malaria. We will work with governments and others on an enhanced control program in at-risk regions where we operate such as Angola, Cameroon, Chad, Equatorial Guinea and Nigeria. We will also help fund leading efforts such as the Harvard Malaria Initiative and the Medicines for Malaria Venture, which hopes to develop new antimalarial drugs through private-public research partnerships.

The scourge of malaria will not be easily eliminated. But progress can be and will be made as long as the determination to fight this most widespread of killers can be sustained.

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# Sifting and winnowing

Twenty years ago, ExxonMobil believed that oil prices would continue to rise, allowing us to make money extracting oil from oil shales in Colorado. We were very wrong. Similarly, the U.S. government, confident that petroleum could be economically produced from coal, created the now defunct but hugely expensive Synthetic Fuels Corporation. Oops. More recently, regulators in California thought they could mandate a revolution in transportation with all-electric vehicles.

Oops again.

There are numerous examples of well-intentioned research programs for products nobody wanted, regulatory mandates for advances that proved unattainable, projects that seriously misjudged the costs of production.

Probably the least predictable aspect of economic life is technology, including energy technology.

In 1973, right after the first OPEC oil shock, few would have predicted that U.S. energy use per dollar of GDP would decrease 40 percent by the year 2000. But that's what happened. Some said that energy was such a necessity that the ordinary laws of economics didn't apply.

True, there have been some special incentives for conservation. But energy conservation was mostly achieved by consumers who wanted to save money and by businesses that adopted new energy-saving technologies because they were profitable.

As we have learned, energy efficiency sometimes results from innovations in industries that produce energy and sometimes in energy-using industries; sometimes it comes from

changes in work practices or consumer behavior; sometimes it requires large-scale capital investments. But ultimately, wise use of energy comes from investments in new ideas and approaches.

Today, there are many technical innovations on the horizon that may revolutionize the production and use of energy — fuel cells and gasoline-electric engines for automobiles, natural-gas-to-liquid and clean-coal technologies,

next-generation nuclear reactors, ethanol from waste crops, and improved techniques to generate power using wind and solar energy. What we don't know is which of these technologies, or others yet unidentified, will prove to be the best choice.

After all, who in 1970 could have foreseen the impact of innumerable applications of microcomputers in the energy industry, or the huge improvements in turbine efficiency that have made natural gas the fuel of choice for new electricity generation?

That's why it's important that business and government leaders not pretend that we know enough to force our energy future to conform to some predetermined vision. Nor should some sources be subsidized, thereby masking their true costs and true consumer preferences.

Future improvements can come from oil, gas, coal, nuclear power, alternative energies and conservation technologies. Governments should encourage creativity, competition and, to cite words used a century ago by the Regents of the University of Wisconsin, "that continual and fearless sifting and winnowing by which alone the truth can be found."

## Wise use of energy comes from investments in new ideas

and approaches

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# From darkness to light

It's dark this time of year in Alaska, so dark that even at noon much of it can't be seen very well. But Alaska will gradually emerge into greater light, just as the nation's perspective on energy developments in Alaska will hopefully evolve.

Perhaps the most controversial issue affecting Alaska's future and the nation's energy policy is whether to allow exploration of a limited portion of the Arctic National Wildlife Refuge (ANWR) in far northern Alaska.

The new administration in Washington is on record as favoring exploration to help address America's need for reliable energy. And representing an opposing view, *The New York Times* editorialized last week against exploration of ANWR.

The *Times'* arguments deserve some response.

The paper acknowledges the need for a rational energy strategy, a pretty obvious conclusion with the country now being roiled by regional energy problems almost every six months.

But don't touch ANWR, according to the *Times*. It's not the best place to look for gas, we are told, though the area has not been explored.

We are also told that there is a lot of gas elsewhere in northern Alaska, only oil companies haven't tried very hard to transport it south. This is half-right. There is a lot of natural gas on the North Slope. We in Exxon-Mobil own more than any other company,

and with other owners have for decades tried to figure out how to economically get it to consumers. But heretofore—low prices for gas and very high transportation costs have made that impossible.

The editorial further states that only relatively "trivial" amounts of oil may be present in ANWR — three billion barrels of economically recoverable oil according to one government estimate. In this oil company's view, three billion barrels would be a significant amount, and three billion barrels is only a guess, since — we repeat — ANWR has not been explored. Much more could possibly be found

Echoing others, the *Times'* editors believe exploring will "potentially corrupt" the area's environment. Yet earlier the same week, the *Times* included an excellent and lengthy article in its Science section about how with advanced technology, it is now possible to explore for oil and gas, even in the Arctic, with minimal effect on the environment. We strongly agree with the *Times* Science section

The editorial concludes that "it should not be impossible to fashion a plausible [national] exploration program that satisfies both environmental and energy needs." That's beginning to see the light

Here's how we would restate that conclusion: energy is important, explore more broadly, do it very carefully, find out what's there. And it is in the nation's interest to apply this approach to ANWR



# A wildcat's legacy

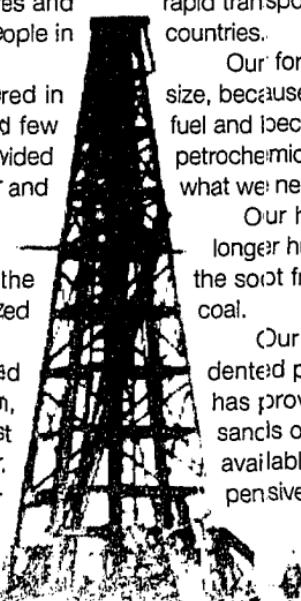
One hundred years ago, a wildcat well, drilled in a corner of Texas on a mound in a swamp, began to produce oil at a rate never before imagined. The Spindletop well ushered in the age of petroleum. And by doing so, it introduced a century of material progress and choice that has transformed our lives and will continue to benefit billions of people in the century ahead.

Though oil had been discovered in Pennsylvania in 1859, it had found few uses by 1901. Most energy was provided by horses, oxen, mules, coal, water and wood. The Spindletop well alone doubled U.S. production, and with other discoveries made possible the vast increases in use that revolutionized the harnessing of energy.

The century that has passed since then has seen liquid petroleum, and natural gas, become the most important sources of energy by far. Mankind's ability to release the potential of these most remarkable substances has led to enormous material progress and, with that, unprecedented improvements in living standards, health, food production and safety.

Skeptical? Think how liberating cars are. We no longer need to live in company homes next to a factory or above a store where we work. Consider airplanes, and the world they have opened up and also made closer. There are no coal-fired or horse-drawn airplanes.

Consider plastic car safety seats and bike helmets, or intravenous fluid containers, surgical gloves and arterial stents. All of these



are derived from petroleum, and they save untold numbers of lives each year.

Food no longer spoils as often due to refrigerators that use petrochemical-based refrigerants and insulation. Fruits are available year round because petroleum fuels allow rapid transportation from distant fields and countries.

Our forests are actually increasing in size, because we no longer need wood for fuel and because modern petroleum- and petrochemical-based agriculture can grow what we need on much less land.

Our health is far better, as we no longer huddle in small homes, inhaling the soot from fires made from wood or coal.

Our economy and our unprecedented prosperity are based on oil. It has proven transformable into thousands of uses. It is easy to transport, available in large quantities, less expensive than all competing products, and environmentally cleaner than many energy alternatives.

Unfortunately, not everyone in the world yet shares in the enormous benefits that come from using oil and natural gas. For many people in developing countries, the promise of petroleum remains in the future. But it will come, and billions of poor people in this century will begin to enjoy the benefits that petroleum has already given those of us in the industrialized world.

Spindletop—remember the name. Its legacy deserves the honor.

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# An energy policy for the new administration

Throughout last year's election campaign, energy was one of the more controversial public policy issues. Now a new administration will have to move beyond pronouncements toward concrete, long-term policy steps.

**Above all, policies should encourage more efficient use of energy** as this will benefit both the environment and national security.

Even with conservation, as our economy grows energy use will grow.

Fossil fuels will supply over 80 percent of U.S. energy needs. While new technologies such as hybrid and fuel cell cars may ultimately gain a market, they will still require hydrocarbon fuels. Alternative energy sources such as solar or wind will not become significant until well after 2020.

Fossil fuel sources will be adequate to meet demand but will increasingly be imported.

Against this background, here's what we would put forward for consideration and discussion.

**First,** the most serious issue for the U.S. and other nations is vulnerability due to dependence upon a limited number of energy-supplying countries. This vulnerability can be mitigated by policies designed to increase the amount and diversity of world energy supplies, including those in the U.S.

Restrictions on access to promising resources in the U.S. are especially self-defeating and should be reconsidered. Claims that resource exploration and development will irreparably harm the environment—offshore or in Alaska—simply do not reflect current industry practice or technology.

Equally, unilateral economic sanctions are rarely effective but do discourage development of non-U.S. energy supplies that would add to global

supply diversity. Thus, sanctions policies are also ripe for revision.

Maintaining strategic stocks for severe supply disruption risks is wise, but using these stocks to manipulate prices during temporary market surges can discourage private sector actions and be counterproductive.

**Second,** in pursuing environmental improvement, the guide should be a science-based, cost-benefit approach.

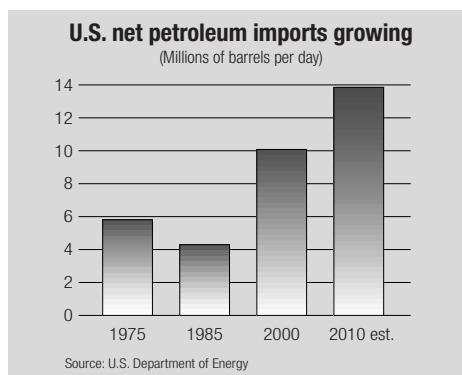
Common sense should be used when pursuing ambitious goals, including reasonable standards and time frames for new technology introduction. Regarding climate change policy, the unrealistic and economically damaging Kyoto process needs to be rethought.

**Third,** private compa-

nies will be central for energy development and progress. Private companies have successfully developed energy to fuel economic growth, and will need market-based approaches and operational flexibility to adapt to the future energy environment. General tax and trade policies should therefore support, but not subsidize, the private sector role in technology, resource development and trade.

**Fourth,** technical innovation will be vital to finding energy supplies, lowering costs, addressing environmental concerns, and developing future energy systems. The government should support technological change but avoid temptations to subsidize or to pick winners. Technological progress can endure only when subjected to consumer preferences and market tests.

A sound energy policy is not beyond reach if approached without partisanship. We encourage the necessary dialogue and stand ready to participate.



This week ExxonMobil is donating its space to the Washington Legal Foundation

## Punitive Damages: The "Wild Card"

Nearly ten years ago, Justice Sandra Day O'Connor observed that "punitive damages are a powerful weapon. Imposed wisely and with restraint, they have the potential to advance legitimate state interests. Imposed indiscriminately, however, they have a devastating potential for harm."

Punitive damages are intended to protect society by punishing unlawful conduct or serious wrongs and deterring their repetition. Usually, *legislatures* define such conduct and prescribe penalties. Where punitive damages are concerned, however, this task has been assigned to the judicial system, where juries determine whether certain conduct warrants punishment and, if so, how much.

Unfortunately, people who serve on juries are not given much help in performing this task. Legislatures have extensive investigative resources to identify societal problems and craft solutions. By contrast, a jury's ability to obtain information is limited. It hears only evidence introduced by the litigants — private parties pursuing private goals. Indeed, the jury is prohibited from seeking additional information. As a result, juries frequently lack the information needed to fully define the public interest and assess punitive damages.

Further, juries receive little guidance from the courts. Justice O'Connor observed that "rarely is a jury told anything more specific than 'do what you think best.' " In fact, many large punitive damage awards are later overturned or significantly reduced. Like a "product recall," this is a clear indicator that something is wrong

with what the judicial system is "producing."

The true cost of punitive damages, however, does not lie in the occasional blockbuster award. That is the tip of the iceberg. A more serious problem is the increasingly pervasive presence of punitive damage *claims*. Cases that previously would have been pursued as simple breach of contract actions now frequently include an additional claim for punitive damages.

This trend has a destabilizing effect on the legal process and the conduct of legitimate business affairs. All fifty states have substantially adopted the Uniform Commercial Code in recognition of the need for uniformity, stability and predictability in business dealings. But a claim for punitive damages introduces a "wild card" by raising the financial stakes enormously. The resulting uncertainty makes disputes more difficult to settle. The important social goals of uniformity, stability and predictability are subverted. And the costs of litigation and excessive settlements are ultimately passed on to customers in higher prices.

Does the present system produce a just and rational result? Certainly there is much room for improvement. The most important first step would be to establish objectively measurable criteria and limits for assessing punitive damages. This would permit more disputes to be settled before trial. Juries could decide the remainder and wield this powerful weapon "wisely and with restraint," without misguidingly inflicting devastating harm.

Ellis J. Horvitz  
Horvitz & Levy, LLP



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# Action, not talk: cogeneration and climate

Among the more promising approaches to addressing the risks of climate change are those that rely upon economically attractive actions and advanced technology.

One good example is the increasing use of cogeneration units at major industrial facilities such as petroleum refineries and chemical plants. These cogeneration units make economic sense, save energy and reduce carbon emissions.

Our facilities use large amounts of electricity to run pumps, compressors, instruments and lights, and use steam to transform raw materials into consumer products. Traditional practice has been to generate steam by burning oil and gas, and to buy electricity from outside power companies. However, conven-

tional power generation entails large energy losses since otherwise useful energy escapes as hot gases or steam, is used up by friction, is lost in transmission over power lines, or radiates away from hot equipment. Overall, only a small fraction of the energy theoretically available can be put to "work."

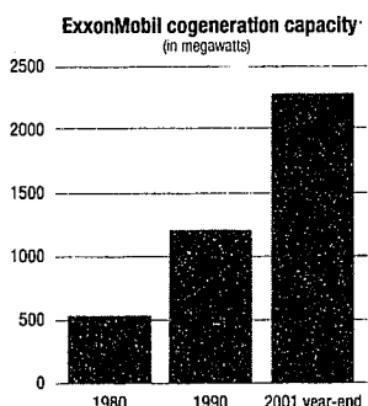
The results: higher energy use, higher costs, greater emissions of carbon dioxide and other byproducts of combustion.

Advances in energy management and turbine technology have transformed this picture. Increasingly, refineries and petrochemical plants are "cogenerating" power. This means that a fuel, usually natural gas, is used directly in a large power turbine that generates electricity for running the plant. The hot gases emitted

from the turbine can then be used to produce hot water and steam without consuming other fuel for that purpose.

The overall efficiency of this process can be twice as high as older approaches, saving both energy and money. Moreover, since natural gas is usually the fuel of choice, carbon dioxide and other emissions are inherently lower.

ExxonMobil is a leader in the installation of cogeneration. The chart shows that we can



generate the equivalent of 2,300 megawatts of electricity. Cogeneration now meets about 70 percent of our refining and chemical plant needs.

Our cogeneration saves the energy equivalent to more than the annual residential electricity needs of Maine and New Hampshire.

The energy saved is about one-fourth of that generated as electricity by all the wind and solar power facilities worldwide.

The capacity we have in place has reduced carbon dioxide emissions by almost 6 million tons a year from what they would otherwise have been.

Another 1000 megawatts of cogeneration is under development, and our ultimate cogeneration potential is even greater.

This is but one example of what can be done to save energy and reduce both costs and emissions. With time, technology and a reliance on voluntary action an enormous amount of progress has been and will be made, to the benefit of companies, consumers and the environment.

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Adding to energy supplies

## Saudi Arabia: the opening for natural gas

The Kingdom of Saudi Arabia has long been known as a leader in the production of crude oil.

Saudi oil production, now about 8 million barrels per day, is by far the largest in the world. Oil and refined products from Saudi Arabia have helped fuel global economic growth for decades and will continue to do so for many decades. In times of crisis, such as the 1990 Gulf War, the Saudi government has been willing to increase production to offset losses elsewhere, thereby limiting economic damage to consuming countries.

Recently, Saudi Arabia initiated three large natural gas projects that have important implications both for the Kingdom itself and internationally.

The projects, called Core Ventures, were awarded to three consortia of international oil companies. ExxonMobil is pleased to have been chosen to participate in, and to lead, two of these ventures.

Although the details and size of each Core Venture differ, they share several important characteristics:

**The projects involve developing major gas reserves and exploring for more.** Saudi Arabia has until now emphasized its oil production, and has not brought its considerable natural gas resources to the equivalent level of development. That will now be changing as gas is developed for domestic use.

**The natural gas will be used in an array of large new industrial plants** that will dramatically expand Saudi Arabia's economic

base. Some facilities will separate hydrocarbon liquids from the natural gas and bring these to market. New world-scale petrochemical plants will use the gas as feedstock and export chemical products worldwide. Electrical power generation plants will be built to further Saudi industrialization and to serve consumers. And, important for a land that is largely desert, a series of large new desalination facilities will provide fresh water.

This series of projects are also attractive as they are based on clean-burning and plentiful natural gas.

The total estimated investment by industry in the two ventures in which we are involved will likely exceed \$20 billion.

These projects are of considerable significance.

Clearly, they will underpin greater Saudi employment and economic and technological development, which are important for the country itself as well as for regional stability in the

Middle East.

They also signal a further willingness to undertake partnerships with private companies to provide additional and environmentally responsible energy development, and to do so under attractive investment arrangements.

Increasing the supply of energy and petrochemicals to an expanding global economy has long been a mainstay of Saudi policy. The new gas ventures represent a major next step in the continuation of this approach, and one we should all welcome.



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# China trade: self-interest and statesmanship

This month, the Congress will again consider the critical American interests related to China and international trade. The House of Representatives will soon vote whether to extend normal trade relations with China for another year. We urge the House to do what it and the rest of the U.S. government have done for many years: support ongoing trade with China, encourage engagement with that country and its people, and underscore America's commitment to open international trade and investment.

Last year, Congress passed and President Clinton signed legislation establishing permanent normal trade relations with China. However, permanent normalization was contingent upon China joining the World Trade Organization (WTO). Negotiation of the many bilateral and multilateral agreements necessary to do this has been prolonged, forcing the normal trade status to be renewed annually until China joins the WTO.

President Bush has wisely chosen to continue normal trade. Recently, U.S. Trade Representative Robert Zoellick announced that the U.S. and China have reached consensus on bilateral trade arrangements. This will help pave the way for China's WTO membership, possibly this year.

Because China and the United States have a number of disagreements in important areas unrelated to trade, some in the House would like to "send a message" to China by passing a resolution withdrawing normal trade relations. It is our view that this would be unwise.

The importance of U.S.-Chinese economic relations transcends dollars and cents. A healthy economic relationship helps establish a solid platform for cooperation and dialogue on many other matters. It presents an arena in which understanding can grow, and a vehicle through which beneficial change can take place.

Normal trade relations are important in promoting economic reform in China. The economic links are vital to Chinese citizens who depend to a great extent on overseas trade for their livelihood and their hopes for the future. And the economic relationship between American and Chinese firms has been a key element in opening China

to greater reliance on market-based approaches and greater familiarity with advanced business practices.

Economic relations have been one of the most successful areas of cooperation and growth involving our two countries. China is America's second-largest trading partner, with total trade exceeding \$120 billion. U.S. exports to China grew 36 percent in the first quarter of this year, helping cushion the U.S. economic slowdown. U.S. investments in China now approach \$30 billion. These economic links strengthen our economy and bring benefits to virtually every American consumer through lower prices.

Accordingly, we urge the House to reject the call for a suspension of normal trade relations with China. Both statesmanship and self-interest argue for continued support of this vital intergovernmental and economic relationship.

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# Science from sea to shining sea

Children across the country have new options for combining G-rated entertainment with science education. Nationwide, more than 100 hands-on science museums and technology centers are giving our young people — in fact, people of all ages — a better understanding of science and technology than previous generations have ever experienced. From Baltimore's Maryland Science Center to The Science Place in Dallas, the long-established Museum of Science and Industry in Chicago to the Children's Discovery Museum in San Jose, a more science-savvy citizenry is learning for itself how things — and the world — work.

It's a positive trend that we at ExxonMobil are proud to support. Schools remain the most important places where interest and skill in science-related subjects must be nurtured. But with technology so important in so many areas of life, it's essential that other institutions play a part in encouraging children to develop a strong interest in science, mathematics and engineering.

That's why in 1988 we chose to be one of the initial investors in Liberty Science Center (LSC) in Jersey City, New Jersey. The financial support that we and many others have provided has fostered the growth of LSC programs. The museum now includes many hands-on and interactive exhibits, including a one-of-a-kind ex-

hibit called E-Quest: Exploring Earth's Energy. This learning experience takes visitors on a fascinating journey through the five major sources of the earth's energy and demonstrates the extraordinary ways humans have explored for and harnessed energy sources. The exhibit exemplifies how science centers are finding new approaches to making science more accessible to young people.

But what museums such as Liberty Science Center ultimately provide — a better understanding of science and technology — is not important just for children.

Health sciences help each of us decide what to eat and how to live healthier lives. Greater familiarity with scientific and technological concepts can provide some insight into what companies might be better investments for our savings, or what career paths we should suggest for our children. Many public issues and even some court cases depend on scientific analysis and technological developments. Knowledge of the scientific process can help us make informed and fair decisions in the voting booth and in the jury box.

So we heartily recommend adding a science museum or technology center to your weekend schedule, if you live near one, or to your itinerary on any trip where you'd like to entertain the kids and yourself, and learn something to boot. You'll be glad you did.



## ExxonMobil

To find out more about the many science and technology museums across the continent and around the world, log on to <http://www.cs.cmu.edu/~mwm/sci.html>

# Pounds of prevention, tons of cure

Twelve years ago this week, the *Exxon Valdez* ran aground in Prince William Sound in Alaska and lost one-third of its cargo of crude oil, more than 260,000 barrels. Tanker safety became a public issue overnight.

This regrettable accident led us immediately to review the practices of Exxon Mobil Corporation and our operating affiliates. But accident prevention and response depends on far more than what one company can do alone. We therefore realized that we would need to work with many in industry and in governments, around the world, to ensure improved tanker safety.

And improved it has been. In the last four years, our owned ships have transported more than 2.8 billion barrels of oil worldwide, and lost less than 10 barrels. This is less oil than that needed to fuel one car for 10 months, yet we carried oil sufficient to fuel 240 million cars for a full year. And we plan to continue to improve.

This record has come about due to focused and sustained attention to safety.

Soon after the *Valdez* incident, we put into place an augmented safety and environmental management system, which we call OIMS (Operations Integrity Management System). As part of this, we have invested in advanced navigational systems, including a government- and industry-sponsored electronic chart display and information system. We have upgraded vessel inspections and re-

pairs. Tanker routes are chosen to avoid high-risk areas and tug escorts are provided where needed in ports. We have established marine terminal safety standards and conduct scores of inspections to confirm that these high standards are met. We do random drug and alcohol testing of those in designated safety-sensitive positions, and have expanded training of our vessel employees to ensure the highest level of professional competence.

But we know that another accident might happen, even with the best of systems and attention to safety. That's why we have invested heavily in emergency response capabilities, in collaboration with governments and other shippers around the world. We have also continued the largest oil spill response research program in the industry, the results of which are shared with others.

Other companies have also put increased attention on tanker safety. The U.S. Coast Guard reported that in 1999 and for all companies, less than 200 barrels were spilled out of 3.2 billion barrels delivered by tanker to the U.S. This safety record is remarkable, and improving.

Tanker safety demands vigilance, systematic management, industry-wide cooperation and responsible regulatory oversight. All are needed to ensure that the public and the environment are as safe as we can make them.

## A vigilant and sustained focus on safety has cut tanker spill rates dramatically



# How much oil is there?

Nobody knows for sure. We do know the oil industry has found more oil than it has taken out of the ground. In 1970, before the first oil shock, the world's proved reserves — i.e., discovered oil resources that could be produced economically using then-current technology — stood at a little more than 500 billion barrels. Last year, they were almost double that.

The amount that could ultimately be discovered and produced may be considerably larger. Current estimates range anywhere from 1.5 to 2 trillion barrels of crude oil — about twice as much as the world has already produced. This is encouraging, because 50 percent of the oil supplies needed 10 years from now is not yet on production.

But there's more to the story.

Besides conventional oil there are large, known sources of "heavy," tarlike oil in Canada and Venezuela. For example, in the Orinoco oil belt, or "Faja," of eastern Venezuela, this heavy oil is located in a thick lattice of ancient riverbeds about 280 miles long and 60 miles wide. This deposit alone is estimated to contain about 1.2 trillion barrels of heavy oil, or about twice as much as current proved reserves of conventional oil for the entire Arabian Gulf. For many years, this deposit was a tantalizing prospect, but economically out of reach.

Not any more. Yesterday, at a ceremony in Jose, Venezuela, President Hugo Chavez

and representatives from the Government of Venezuela, PDVSA (the national oil company of Venezuela), and PDVSA's joint venture partners, ExxonMobil and Veba Oel, celebrated the official opening of the Cerro Negro Project.

This project includes investments in the oil field, in pipeline transportation, and in equipment to convert the extra-heavy, high-sulfur Cerro Negro crude oil to a lighter, low-sulfur crude. Some of this crude will be made into gasoline and other products at the Chalmette refinery in Louisiana. The project is expected to produce more than 100,000 barrels a day of lighter crude.

It took almost 40 years from the time the Cerro Negro resource was identified to reach this milestone. New technologies in drilling, production and processing played a critical role. But just as important were the cooperation and active support of the government of Venezuela. The theme for the project opening was "Together we're building a better future."

By working together we not only added another source of oil supply that could last for three decades — and much longer as facilities expand — but we also provided opportunities and jobs for the people of the State of Anzoategui and additional oil revenues for Venezuela.

So, how much oil is there? A lot, and we'll need it. Now, with heavy oil from the Faja, there's potentially a whole lot more.



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## Improving energy use

Securing America's energy future requires continued diligence in pursuing new approaches to producing and using energy more efficiently.

We all want America to continue to prosper, and prosperity takes energy to fuel growth. Even with significant conservation efforts and efficiency gains, the U.S. will likely need about 25 percent more energy in 2020.

Considering the future energy demands, energy use and supply have become topics at the dinner table and throughout the halls of Congress.

Though new and diverse supplies are needed, we also believe new technologies and processes should be a part of the solution to ensure that energy is used more efficiently. For example, cogeneration plants use efficient gas turbines that require up to 50 percent less energy than conventional approaches. ExxonMobil already has cogeneration facilities at 27 locations worldwide, with more planned. These facilities produce enough energy to power the homes of more than 2.5 million people in the U.S.

Our efforts to reduce energy use are ongoing. What do you pay for energy in your home or office? Would you like to receive a bill for \$190 million per month? Neither would we. Three years ago, that was the monthly tab for running our refineries and chemical plants.

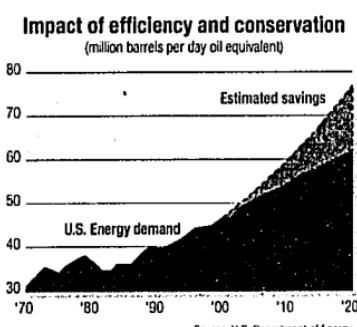
Since the energy crisis of the early 1970s,

we have worked hard to be more energy-efficient. Between 1973 and 1998, we were able to improve energy use at our refineries and chemical plants by more than 35 percent. In 1998, a group of ExxonMobil refining and chemical managers was challenged to develop a comprehensive and sustainable system for further reducing energy worldwide. This effort led to our

Global Energy Management System (G-EMS).

Because the processes for making petroleum and chemical products require large amounts of heat, the keys to saving energy are to find ways to minimize the loss of heat. With G-EMS, we are now using a disciplined, comprehensive approach to find energy savings within our operations. Our current assessment shows that we should be able to improve our energy efficiency by another 15 percent during the next several years — one-third from operational improvements and the rest from investments, including cogeneration. Additional benefits include lower emissions of carbon dioxide, sulfur dioxide, nitrogen oxide and other gases.

Securing America's energy future requires improving our energy use. Although new and diverse supplies must be part of the solution, innovative approaches to using energy efficiently should also be pursued vigorously. A sound energy policy will benefit the nation and every consumer.



Source: U.S. Department of Energy

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# Hydrogen: promise and challenge

Hydrogen is the most abundant element in the universe. When burned, it produces no emissions but water. Combined with oxygen, hydrogen can power fuel cells, an advanced technology under development for automobiles. Could hydrogen be the key to our energy future?

To become a reality, hydrogen fuel faces three major challenges:

**First, how do we produce the hydrogen?** Although common in many compounds, such as water, pure hydrogen is rare. Like electricity, it's a clean energy carrier, but must be made from another energy source. One possibility is to produce hydrogen

from hydrocarbon fuels, such as natural gas.

An alternative process called electrolysis can extract hydrogen from water, but only by using lots of electricity, which is typically generated by fossil or nuclear fuels.

Therefore, and unfortunately, all known ways of producing hydrogen today use energy and are costly, making it much more expensive than gasoline.

**Second, where do we produce the hydrogen?** We could make hydrogen in large central facilities and then move it to consumers. If so, we would need a new infrastructure of high pressure pipelines, storage facilities and retail station pumps. Or it may be possible to produce and store hydrogen in a smaller installation at a modified retail station.

Another option could be to make hydrogen on the vehicle itself. We are developing technology to produce *hydrogen from gasoline* on

board a fuel cell automobile as it is needed, thereby using the existing gasoline infrastructure.

Whichever option is chosen, we will need to address very real safety concerns with the distribution and use of high-pressure hydrogen, whose combustion properties merit very careful consideration.

**Third, can hydrogen meet our economic and environmental goals better than other options?** Even today, showrooms feature new conventional engines and some electric-gasoline hybrids that also hold the promise of cleaner, more efficient automobiles.

There's only one way to find out which technologies are the best — let them compete for your business in the marketplace. Consumers want to know not only which vehicle and fuel combination are the cleanest and most efficient, but which provide the highest safety, reliability and performance at the lowest cost.

Hydrogen deserves a chance to earn its place and could become important in several decades if the formidable challenges it poses can be resolved. ExxonMobil is working with automobile companies to develop a range of advanced vehicle and fuel technologies. We are participating in discussions with governments, public interest groups and other firms around the world to evaluate all options, including hydrogen.

Our objective remains the same — offering you, the consumer, the best, cleanest and most affordable fuel for your transportation needs.

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## A responsible path forward on climate

This week the Global Climate and Energy Project (GCEP) was announced at Stanford University. The initiative creates an innovative academic and private-sector collaboration that is intended to undertake fundamental precommercial research on ways to address climate and energy issues.

The multiyear project is an unprecedented alliance among ExxonMobil and other leading global companies. These companies will provide significant sustained funding for research at Stanford and complementary academic institutions worldwide.

It is hoped that this initiative will accelerate the development of low-greenhouse-emission energy technologies that will be practical and economic.

Stanford has a rich history of developing strategic partnerships to address public issues using advanced technologies. It has itself written that "this century's energy challenge is to accommodate a transition to new technologies and new energy options in a way that recognizes the centrality of energy use to human well-being in the developed world and its importance to the aspirations of the developing world for a better life."

We wholeheartedly agree.

On an overall basis, many of today's suggested alternative energy approaches are not as energy efficient, environmentally beneficial or economic as competing fossil fuels. They are often sustained only through special advantages and government subsidies. This is not a desirable basis for public policy or the provision of energy.

The GCEP will try to find innovative and cost-effective ways to approach both energy

and prosperity needs. It will look at the full spectrum of energy resources and end uses, including improved generation and transmission of electricity, advanced transportation options, the expanded use of hydrogen, the contribution to be made by fuels derived from crops and plants, and next-generation coal, nuclear and renewable energy.

It will assess the potential for carbon sequestration and for carbon dioxide separation and storage.

The infrastructure required to produce and deliver energy products will be addressed, along with needed advances in materials, combustion technology and systems management.

The focus will not be placed solely upon industrialized country options — it will also include the prospects for truly global adoption of advanced technologies.

Balancing the long-term risks of climate change against society's need for unsubsidized but affordable energy requires improved knowledge, cooperation among many organizations, and advanced technology.

In fact, we believe that technology provides the key avenue to solutions that manage long-term risk and preserve prosperity. And development of technological options will almost certainly require decades of research and many billions of dollars of investment over an extended period.

This initiative is the beginning of what is an admittedly ambitious undertaking that will require the sustained application of significant resources. Yet we are confident that the effort will help guide us toward a sustainable and environmentally sound energy future.



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# Managing greenhouse gas emissions

It is our view that better scientific understanding of climate change, human influence on it, and the associated risks and possible consequences are needed. We are heavily involved in such scientific research and will describe our efforts in another editorial.

But we are also taking other actions to minimize the risks of climate change.

An important first step in approaching reductions of greenhouse gas emissions is accurately measuring them, by plant and by business, using agreed-upon and reliable methodologies.

Because no single method has been developed and accepted across industries and companies, accurate comparisons are difficult.

Therefore, ExxonMobil and others have initiated a consultation among energy companies, under the auspices of the American Petroleum Institute and the International Petroleum Industry Environmental Conservation Association, to improve reporting and reach common agreement on a measurement protocol.

But we are not waiting for wider agreement to begin our own reduction efforts.

For example, ExxonMobil operating units are implementing steps to reduce greenhouse gas emissions, consistent with safe operating practices and sound economics.

Our activities are directed toward real and measurable reductions in energy use, which we believe is a more effective approach than emission-trading schemes that are unlikely to make a worldwide difference.

We have developed a global energy-management system to identify opportunities to fur-

ther reduce energy use. Energy efficiency has already improved 35 percent in our refineries and chemical plants since the 1970s. We expect to see an additional 15 percent improvement.

All business functions are reducing gas flaring and other energy losses through careful monitoring of operations, sound maintenance practices, improved equipment reliability, and smarter control technology.

Where appropriate, a judicious adoption of fuel switching will increase the use of energy with lower carbon-emitting characteristics.

Good ideas are being shared worldwide to ensure consistent approaches and to drive performance improvements.

To maintain emphasis on this multifaceted effort, we will steward results annually and publicly report them.

And we are also supporting promising new technological approaches. These will include advances that can be adopted for improving the energy efficiency of our own operations, as well as technology partnerships with other companies and universities for wider social application.

The risk of climate change and its potential impacts on society and the ecosystem are widely recognized. Doing nothing is neither prudent nor responsible, but the same may be said of rash action. Energy and the economic growth it supports are too important to be treated cavalierly.

The goal of the many activities we are undertaking is to produce practical future reductions in greenhouse gases while we improve our understanding of the science of this complex issue.

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To learn about our efforts to address greenhouse gases, log on to  
[www2.exxonmobil.com/Corporate/Newsroom/Publications/c\\_cc\\_02/pdfs/she.pdf](http://www2.exxonmobil.com/Corporate/Newsroom/Publications/c_cc_02/pdfs/she.pdf)

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The outlook for energy: part VI

## Energy beyond 2020

Historically, long-term estimates of how much oil and natural gas exist have been far too low, primarily because forecasts have not sufficiently anticipated the contribution of technology and access to previously barred areas.

Nevertheless, when additions to reserves of petroleum-based energy are no longer adequate to replace production, reserves will begin to decline. We do not know when this will be, as advances in technology will continue to allow us to find petroleum in unanticipated places and develop resources that are currently too expensive.

Of course, economic growth and prosperity are highly dependent on affordable energy. As a result, further efforts to discover and extend the life of oil and gas resources are critical for continuing to improve global standards of living.

Today, oil and natural gas account for about 60 percent of world energy use and are likely to remain the dominant sources of energy through at least mid-century.

Prolonging the availability of needed petroleum resources requires serious public dialogue, increased consumer awareness and a political willingness to take advantage of the energy options that we know exist.

Conservation and wise use of petroleum energy are central to prolongation. Accordingly, we devote hundreds of millions of dollars each year to make our operations and products more energy-efficient. And we strongly support other efforts with the same goal, including work on ad-

vanced automobiles for better fuel economy, and cogeneration for better operating efficiency.

But meeting future demand also depends on access to economic resources. For example, known or suspected petroleum resources exist offshore or in areas where exploration and development can be accomplished with little impact. These resources will be needed: access to them should not be delayed forever.

And petroleum is not

the only energy resource that we will need to find economic ways to use. For example, coal resources are enormous — sufficient for centuries. The challenges associated with

coal — particularly land-surface impact and air quality — continue to be the focus of technological advances. Other energy forms, such as wind power, are also likely to become more economical and widespread because of technical advances but are also likely to remain small in the context of total energy demand.

Equally vital is a commitment to research and development of very challenging energy options. The full spectrum of alternatives is being investigated by efforts such as the Global Climate and Energy Research Project at Stanford University, which ExxonMobil supports.

Above all, the energy business around the world is immense and touches everyone. To continue to provide opportunities to all people, we will need to simultaneously improve the efficiency of energy use and develop all economic and competitive energy sources.

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**The outlook for energy: part V**

## Building a more energy-efficient world

Close to one hundred years ago, President Theodore Roosevelt remarked that "the conservation of our national resources is only preliminary to the larger question of our national efficiency." A century later, the linkage between energy use and economic progress is clear. Reliable and affordable energy supplies have been vital in enabling a remarkably rapid improvement in the quality of life here and around the world.

With growing prosperity and energy use, it is natural that questions regarding the efficient use of energy continue to engage consumers, suppliers, investors and policy-makers.

From a historical perspective, energy efficiency has improved dramatically, yielding economic and environmental benefits. As shown in the accompanying chart, industrialized countries now use about one-third less energy to produce \$1,000 of economic output than in 1970. On a worldwide basis, total efficiency gains represent energy savings of more than 55 million barrels of oil equivalent (BOE) per day. Without these savings, energy use today would be more than 25 percent greater.

Significant advances in technology have led to better energy efficiency in homes, offices, transport and industrial facilities. ExxonMobil's Global Energy Management System and other efforts have helped improve energy efficiency in our own refineries and chemical plants by more than one-third over 25 years. For example, our cogeneration facilities have improved our efficiency and helped cut expected carbon dioxide

emissions by almost 7 million tons annually, equivalent to about 750,000 fewer cars on the road.

Worldwide, we expect efficiency improvements to continue, averaging about one percent per year and resulting in additional savings of about 60 million BOE per day by 2020.

In power generation, gains will come from

growing use of efficient natural gas turbines, combined heat and power facilities, and technologies that continue to improve emerging options.

New transportation technologies, including advanced internal combustion engines and hybrid cars, will also boost energy efficiency.

As the chart shows, we also anticipate continued efficiency improvement in developing nations, which now consume roughly three times more energy per unit of GDP than the industrialized world. Performance will improve as better technologies reach these developing economies, aided by free trade and investment.

Expanding free-market competition and commercial incentives will promote energy efficiency. Market-based prices will provide critical signals for energy suppliers and for the millions of consumers who each day make important personal decisions and tradeoffs regarding the value of energy use and conservation in their own lives.

The path ahead remains to be navigated. But we look forward to the journey, confident that the legacy of this generation will be a better, more energy-efficient world tomorrow.

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## Win-Win-Win

There's nothing quite like a winner, except perhaps those rare instances when everyone is a winner. And we have a triple winner—our costs go down, your pocketbook stays fuller, and environmental emissions are lower.

First some background.

It takes a lot of energy to produce energy. It is expended each step of the way as petroleum is produced, shipped long distances and manufactured into consumer products. Fifteen to 20 percent of the original energy in petroleum may be expended getting the product to you.

Energy companies are well aware that any energy consumed in operations subtracts from what can be sold. And in keeping with the desire for conservation, we strive to produce as energy-efficiently as possible.

Within ExxonMobil, we have developed a comprehensive Global Energy Management System (GEMS) to achieve greater energy efficiency. This system looks at energy consumption at every link in the supply chain—from production and shipping to manufacturing and transportation. We apply years of experience and the latest technology to optimize energy consumption each step along the way.

For example, oil products are made by heating crude oil to very high temperatures, separating it into components, employing catalysis and other techniques to improve the quality of components, and then blending these into fuels, lubricants and petrochemicals.

We employ many technologies to recover and recycle this heat to minimize energy

consumption. Furnaces use sophisticated computer programs to optimize combustion. Equipment is insulated to reduce heat loss. Processes are integrated to exchange heat between hot streams that need cooling and cold streams that need heating. The result is less consumption and lower emissions.

Another major contributor to energy efficiency is cogeneration, a process that generates both steam and electricity

from clean-burning natural gas. Cogeneration is much more efficient than the alternatives. We use most of the steam and electricity in our manufacturing plants, and any surplus is sold to public utilities.

Energy savings from our 80-plus cogeneration units worldwide are equivalent to the residential electricity needs of Maine, Vermont and New Hampshire combined. These facilities have avoided carbon dioxide emissions about equal to the amount emitted by 750,000 cars. And using both cogeneration and GEMS, we are reviewing measures that could improve our energy efficiency by another 15 percent over the next several years.

A balanced approach is required to ensure that the world's growing energy needs will be met. The road to conservation and efficiency does not necessarily require government mandates, complex international agreements, years of testing and development. The economic and environmental incentive already exists, and companies can voluntarily begin making a difference, yielding long-term benefits for companies, consumers and the environment alike.

# ExxonMobil

# The global climate and energy challenge

Six billion people currently inhabit the earth. A quarter of us have only limited access to energy services: heat, transportation and electricity for myriad uses. In 20 years, another 1.5 billion people will join us, and their living conditions will depend in large part on the availability of energy. Supplying this energy will be a significant challenge, but it is not the only challenge we face.

We humans are interacting with the geochemical systems of our planet on a global scale. The concentration of carbon dioxide in the atmosphere has increased by a third from its preindustrial level, and the resulting change in the acidity of the upper ocean can be detected. Although climate has varied throughout Earth's history from natural causes, today there is a lively debate about the timing and magnitude of the climate's response to the presence of more greenhouse gases in the atmosphere.

While that debate continues, we should consider now how to develop technology options that have much-lower emissions of greenhouse materials (e.g., carbon dioxide, methane and black soot). Supplying the energy required by both well-established and developing societies while at the same time reducing greenhouse emissions will be one of the grand challenges that we humans must face in this century.

Meeting this challenge will require financial resources and the engagement of the best minds we can find.

We can imagine many potential technology paths that have lower greenhouse emissions. In fostering technological innovations that will permit significant reductions in emissions, we need to understand what barriers (including performance, cost, safety, environmental impact and consumer acceptance) will limit our ability to put the new technology in place, and then to attack these barriers with research.

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## One of the grand challenges humans face

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We need options that can be used by people in both developing and developed countries. We should work now to put in place research that will create innovative technologies for energy supply and use in the future. And as individuals we can all contribute by choosing efficient ways to use energy.

A project that will work toward these goals is just beginning at Stanford University with the support of a group of global companies (including ExxonMobil, GE, Schlumberger and E.ON). With initial funding of \$225 million, the Global Climate and Energy Project (GCEP) will unleash the creativity of faculty and students at Stanford and other universities and research institutions worldwide. With a sustained effort in this project and many others, we can begin now to create a path toward an energy future that is feasible and practical — applicable to both the developed and the developing world — with much-lower greenhouse emissions.

Dr. Lynn Orr,  
GCEP Project Director, Stanford University



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## Tight gas

Yes, we know how it sounds. But let us explain.

In the petroleum industry, tight gas refers to natural gas that is in underground reservoirs with low porosity and low permeability. What this means in plainer English is that the underground rock layers that hold the gas are very dense, and so the gas does not flow easily toward wells drilled to recover it.

Natural gas is needed to meet increased U.S. energy demand. And since it is expensive to drill wells, the petroleum industry has worked hard to find ways to produce tight gas economically from fewer wells.

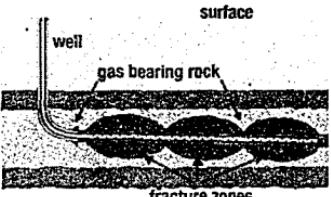
One of the most important approaches is horizontal drilling. In this situation, as the drill bit goes deeper, it is also gradually guided off vertical, until it is drilling horizontally in the rock formations that hold the gas. Wells drilled this way can run for thousands of feet horizontally in underground formations.

Normally, once a well is completed, the oil and gas will flow from the higher-pressure reservoir to the lower-pressure wellbore. However, in tight gas reservoirs, the dense rock layers have to be "fractured" to provide pathways so that the gas can flow more easily.

An advanced technique called multi-frac technology permits the rock to be fractured in several places along these long horizontal wellbores, which means the gas has to migrate shorter distances to reach a location where it

can enter a well and be produced.

One additional advantage of horizontal drilling and multi-frac technology is that with fewer surface well sites needed to produce from a reservoir, there is less land use. On Alaska's North Slope, for example, only three drilling sites on 26 acres of land will be needed to produce petroleum from a field that underlies 117,000 acres.



When a tight gas reservoir extends several thousand feet vertically, horizontal wells won't work. In such circumstances, another technique for improving tight gas recovery in vertical wells is being developed by ExxonMobil researchers.

Simply put, this involves creating a large number of small fractures in each reservoir rock layer rather than a small number of larger ones. Our experience with this approach has led to significant increases in production rate compared to traditional industry approaches. The payoff is much more natural gas from a well and, consequently, more gas reaching the marketplace.

Variations of these approaches are being tried in all parts of the world today. Natural gas that could not have been recovered economically, or that would have to have been left in place underground, is now being produced successfully.

Thanks to the continuing use of new technology in petroleum production.

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**The outlook for energy: Part II**

# **Building the energy future**

Recently we shared our view of the worldwide energy outlook through 2020. Energy use is expected to grow, even with significant efficiency gains, and oil and gas will remain the predominant fuels, reflecting their cost and convenience advantages in meeting consumer needs. Now we will highlight some key implications of this outlook.

**First, the world will need to develop substantial new supplies to meet growing demands.** By 2015, because of depletion in existing fields, the petroleum industry will need to add the oil equivalent of some 100 million barrels per day to production — close to 80 percent of today's levels. To do this successfully will require access to resources, huge investments, timely project development and government cooperation.

Energy dependency between producing and importing nations will continue to grow. Diversifying supply sources will remain important in promoting energy security.

**Second, new technology will be needed to benefit supplies, efficiency and the environment.** Exploration and production technologies — such as 3-D seismic imaging, advanced drilling, and arctic and deepwater development — continue to extend the amount of recoverable oil and gas. New technology that directly detects the presence of hydrocarbons is also under development to enhance supplies.

More-efficient and environmentally improved ways of using conventional energy will continue to be deployed. These measures include personal vehicle technology and cleaner

fuels. Internal combustion engines continue to improve, as do hybrid vehicles that combine a conventional engine with an electric motor.

Longer term, a possible fuel is hydrogen. Although hydrogen is abundant, it takes a lot of energy to isolate it, and considerable costs to distribute and use it safely. Significant breakthroughs are necessary for hydrogen-based systems to be competitive.

## **Providing reliable, affordable and clean energy**

Advanced technologies must also be developed and deployed to achieve reductions in greenhouse gas emissions without impairing global prosperity. New approaches also need to be applicable in developing nations,

which are likely to produce about 60 percent of worldwide carbon emissions by 2020.

**Third, government remains a potent force to promote development.** Nations are relying increasingly on market forces — not prescriptive regulations. They are recognizing that clear and stable legal and fiscal frameworks are essential to encourage investments. This recognition promises to improve the environment for energy development and thereby to improve the welfare of people everywhere.

Today, roughly 85 percent of the world's population lives in developing countries, where GDP per capita is only about 6 percent of that in the developed world. Providing reliable, affordable and clean energy will bring enormous benefits.

Yet doing so will require the concerted efforts of government and business. Each of us has a role to play. We stand ready to do our part.

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## A growing role for natural gas

In the next two decades, we — and others — believe natural gas will be the world's fastest-growing major energy source, supplying one-quarter of the world's energy needs by 2020.

This growth is due to the increasing use of natural gas for making electricity through more-efficient power generation technologies. And it's due to the many advantages of natural gas in cooking, space heating and industrial applications.

But gas is not only efficient; it has lower emissions too. Its emissions of nitrogen and sulfur oxides, particulates and greenhouse gases are about 25 to 99 percent lower than for liquid fuels.

We are also fortunate that gas is abundant around the world. The U.S. Geological Survey estimates global gas reserves will last about 150 years at today's rate of consumption, and others believe this estimate may be conservative.

Even though natural gas has been a mainstay of energy supply in Europe and North America, new sources of supply are increasingly more costly to produce and are located farther from major consumer markets in the United States, Europe and Asia. About half of today's known gas reserves are concentrated in Russia and the Middle East, but other reserves are geographically dispersed.

Providing affordable natural gas to consuming countries is a central challenge for the energy industry. That's why there is an ongoing

need for advanced technologies that will permit gas to be developed from "tight" formations or in remote locations and transported to consumers at a price competitive with other fuels.

For example, "tight" gas is found in dense underground rock formations, but can be unlocked through new rock-fracturing technologies.

Natural gas has traditionally been transported through pipelines, which are expensive to build. That's one reason ExxonMobil

researchers have developed a new high-strength steel that allows natural gas pipelines to be constructed over longer distances at lower cost.

Although it is not feasible to transport gas by pipeline across oceans, gas can be transported on ships as liquefied natural gas, or

LNG, making it possible to supply gas to all the major markets in the world. Recently, larger and more-efficient plants and ships have been developed that promise reduced costs for liquefying and transporting LNG. In fact, we expect such improvements will allow LNG to grow four fold by 2020, serving markets in North America, Europe and Asia.

All of these developments will be needed to meet the growing demand for gas worldwide. The advantages of gas are substantial, so this attractive fuel is expected to become increasingly important in meeting the public's desire for dependable, affordable and environmentally friendly energy.

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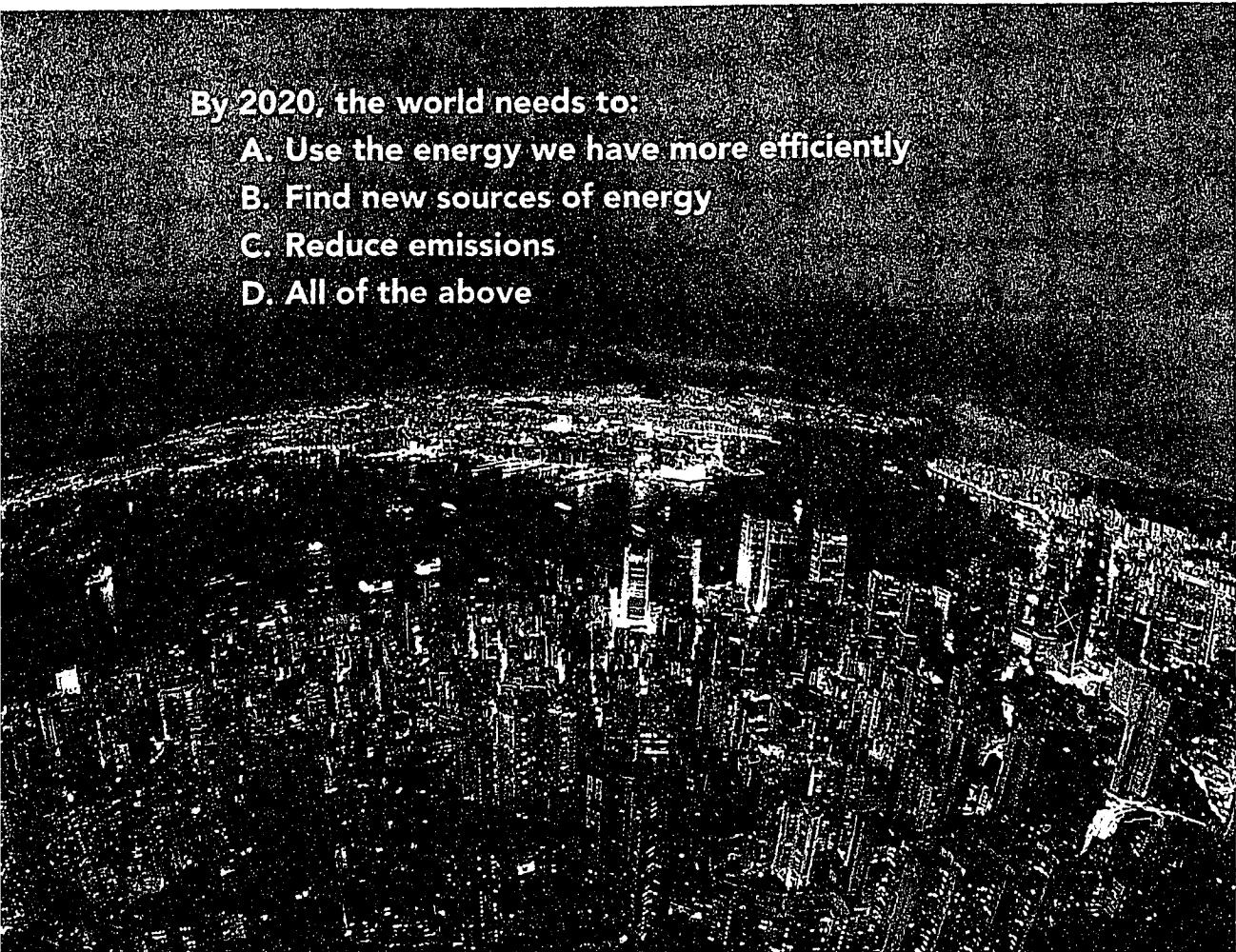
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**By 2020, the world needs to:**

- A. Use the energy we have more efficiently**
- B. Find new sources of energy**
- C. Reduce emissions**
- D. All of the above**



The world is growing fast – more people, more industry, more economic growth. Clearly, the world is going to need more energy. Which is why, at ExxonMobil, we're continually exploring a variety of innovative energy solutions – from advanced exploration technologies to lower emission fuels. We also sponsor one-of-a-kind initiatives such as the Global Climate and Energy Project led by Stanford University – which is researching viable emission-reducing energy technologies. After all, the challenge of supplying the world with energy is great. And for our industry, the answer doesn't lie in one option, but in all of the above. [exxonmobil.com](http://exxonmobil.com)

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**Natural gas: part II**

## **Natural gas ... a need for action**

The recently completed National Petroleum Council (NPC) study on North American natural gas describes a fundamental shift in the natural gas supply/demand balance that has resulted in higher prices. As important, it provides specific recommendations to achieve a better energy balance, with significant potential benefits for consumers, the environment and the economy.

In making its recommendations, the NPC identifies possible scenarios for natural gas — the "Reactive Path" with significant policy conflicts and market tightness — or the "Balanced Future" in which policy initiatives eliminate critical barriers for suppliers and consumers. The NPC emphasizes that each scenario represents an improvement on the status quo, that "choices must be made immediately ... [and] ... the best solution ... requires actions on multiple fronts."

To achieve the economic and environmental advantages of the "Balanced Future," a fundamental need is to "increase supply diversity." Accordingly, the NPC's recommendations target three major supply sources of interest to investors. To increase supplies from the lower-48 states and the outer continental shelf, policies need to increase access to these areas for exploration and reduce permitting impediments to development. To enable Alaskan gas supplies to reach the lower-48 market within a decade, federal and state legislation is needed to expedite approvals and provide regulatory certainty for this major project. And to

expand imported supplies of liquefied natural gas (LNG), accelerated and coordinated regulatory reviews of import facilities are critical.

A second fundamental requirement is to "sustain and enhance natural gas infrastructure." For potential investors, operators and customers, regulations that govern new infrastructure such as pipelines, storage tanks and LNG import terminals need to provide clarity and certainty. Major investments can help mitigate imbalances, but action is needed to ensure projects complete final permit reviews within a year or less from permit application.

A third fundamental need is to "improve demand flexibility and efficiency." Free markets remain vital to encourage energy conservation and efficiency. Accordingly, the NPC recommends changing the implementation of federal and state regulations to permit greater fuel choice for industrial consumers and power generators. In addition, sound public policies in the areas of consumer education, low-income weatherization programs, and energy efficiency product standards can also contribute to conservation efforts.

While the nation's energy balance is a long-term challenge, a central theme of the NPC's recommendations on natural gas is that action now is important to promote investments in needed supplies. Delay in reforms will worsen the outlook. We agree, and encourage rapid adoption of NPC's proposals to help the nation fully capture the economic and environmental benefits of this vital energy source.

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**Natural gas: part I**

## **Natural gas ... finding a balance**

Since its creation in 1946, the National Petroleum Council (NPC) has advised and informed the government on virtually every aspect of oil and gas operations.

Continuing this tradition, in March 2002 Secretary of Energy Spencer Abraham asked the NPC to conduct a comprehensive study on natural gas. The request recognized a considerable change in natural gas markets and underscored the importance of natural gas to the nation's economic and environmental future.

The recently released NPC study ([www.npc.org](http://www.npc.org)) includes significant new findings and recommendations.

The study highlights the strong U.S. natural gas demand growth of 40 percent from 1986 to 1997. Due to its advantages as an environmentally favored fuel, combined with its ability to provide fuel efficiency and timely project development, "power generators and industrial consumers are more dependent on gas...." These benefits have also stimulated growing residential and commercial gas demand.

The study also emphasizes that until recently, North American production kept pace with increasing demand. However, "it now appears ... that natural gas production from accessible basins ... has reached a plateau."

This trend, along with rising demand, has led to "a fundamental shift in the natural gas supply/demand balance ... [and] has resulted in higher prices...."

With gas demand growing and existing public policies limiting access to potential supplies, higher prices were inevitable. This rise in prices has affected all natural gas consumers

and could lead to reduced international competitiveness for the most price-sensitive gas users among U.S. manufacturers.

The study finds that "this situation is expected to continue, but can be moderated" by a balanced approach that includes "increased energy efficiency, immediate development of new resources, and flexibility in fuel choice."

Developing new resources is especially critical. Additional large-scale resources are available, including imports of liquefied natural gas (LNG) and natural gas in the Arctic and access-restricted areas of the U.S. Key NPC recommendations are therefore to "increase supply diversity" and to "sustain and enhance natural gas infrastructure."

To achieve these purposes, it is essential that public policies increase access to resources and reduce permitting and regulatory barriers to project development.

Improving patterns of energy consumption is also vital, so another key NPC recommendation is to "improve demand flexibility and efficiency." Public policies can effectively augment essential market forces through continued consumer education and regulations that provide greater clarity and flexibility to meet governmental objectives.

The NPC estimates that a balanced approach "could save \$1 trillion in U.S. natural gas costs over the next 20 years." Such an important result will require consistent public policies that eliminate barriers to market efficiencies and promote new supplies. We will discuss the NPC recommendations in more detail as this series continues.

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# Weather and climate

In the debate over climate change, there is an understandable tendency to use recent weather events to draw conclusions about global warming. However, weather and climate are not the same — climate is far more complex.

While we all know what weather is, most of us are less clear about climate. A region's climate is defined as the prevailing behavior of its weather, including variability. Several decades of weather must ordinarily be considered to establish the average conditions and variability of climate.

Thus, the recent record cold weather in the Northeast U.S. does not indicate a cooling climate, just as last year's record summer heat in Europe does not confirm a warming world.

Geological evidence indicates that Earth's climate has varied continuously, warming and cooling due to changes on and beyond Earth. Factors as diverse as variations in sunlight and Earth's magnetic field, asteroid impacts, Sun-Moon-Earth orbital interactions, cosmic ray fluxes, continental drift, fluctuations in sea level, volcanic eruptions, changes in the biosphere, and massive ebbs and flows of continental glaciers, have significantly influenced climate.

Changes in one feature can affect others. During recent ice ages, another factor, greenhouse gas concentrations, changed for reasons that remain unclear. Evidence suggests that shifts in the flow of dust and nutrients from lands to oceans may have significantly altered the exchange of carbon dioxide between

the air and oceans.

Observations and theory both indicate that weather and important aspects of climate, for instance El Niño events, behave in a chaotic fashion that may never allow for definitive, long-term predictions. These and other fluctuations produce significant natural climate variability. For example, over the past thousand years historical accounts and scientific data show evi-

dence of a Medieval Warm Period followed by a Little Ice Age.

In the face of natural variability and complexity, the consequences of change in any single factor, for example greenhouse

gases, cannot readily be isolated and prediction becomes difficult. Geological and historical records make clear the need to account for natural climate variability and the integrated response of the entire climate system.

Over the last few decades climate research has made great progress. In particular, research has highlighted the risks to society and ecosystems resulting from the buildup of greenhouse gases. At the same time, scientific uncertainties continue to limit our ability to make objective, quantitative determinations regarding the human role in recent climate change or the degree and consequences of future change.

This reinforces the view that, as countries and societies work to find acceptable approaches to address climate change while continuing to promote global prosperity, there is an ongoing need to support scientific research to inform decisions and guide policies.

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# Directions for climate research

Climate science is experiencing rapid development fueled by significant research budgets and spurred by important policy needs. Progress has occurred in generating new knowledge and in better delineating gaps and uncertainties that limit our current ability to know the extent to which humans are affecting climate and to predict future changes caused by both human and natural forces.

Expansion of scientific knowledge will take time and money. It requires extensive long-term data acquisition, breakthroughs in theoretical understanding of key climate processes, efforts to reconstruct better information about past climate, and the development of more-sophisticated computer models to assess understanding and simulate future climate changes.

Research should include two major thrusts. One supports curiosity-driven and blue-sky research. The pursuit of this type of knowledge will certainly lead to unanticipated results that may help overcome current gaps. Universities will likely take the lead in such research, which is one reason we are supporting climate-related research efforts at major universities, including Stanford and MIT. University programs will also help train students who will be needed to address these challenges over coming decades.

Research should also be designed and carefully managed to address policy needs. Government agencies should design programs that address the most important major areas of scientific uncertainty. The U.S. should also es-

tablish a structured effort to assess the consequences of climate change (accounting for both facts and uncertainties) and the feasibility and effectiveness of policies to adapt to and mitigate climate change.

Areas of uncertainty that require attention have been identified in numerous reports, including several by the National Research Council. Important areas include the role of clouds and aerosols (small particles in the atmosphere), natural climate variability, oceanic currents and heat transfer, the hydrological cycle, and the ability of climate models to predict changes on a regional and local scale.

## Research should address policy needs

Agency-led programs should aim to: (1) better quantify levels of uncertainty and explain their relevance for policy decisions, (2) define and conduct studies to resolve uncertainty and (3) report periodically on results and progress. These programs would benefit from well-structured, independent scientific reviews to assure quality and to steer future efforts based on progress. Research does not always eliminate uncertainty, but such programs will lead to better understanding of what we know and do not know and how our knowledge may affect policy decisions.

The U.S. can be proud of its leadership — over several administrations — in advancing climate research. Despite differing views on what near-term policies are appropriate for addressing climate concerns, an ongoing investment in research will be essential to informing long-term, science-based decisions.

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# All ahead safe

Fifteen years ago, the *Exxon Valdez* ran aground in Prince William Sound in Alaska.

This unfortunate and regrettable accident disrupted many lives, yet it served to focus our energies to significantly improve the safety of our oil shipping.

In the years since the accident, we have had nothing similar occur, despite the risks inherent in marine transportation. We believe our subsequent record of safety stems primarily from disciplined and systematic improvements in the way we address marine safety (and all other aspects of our operations).

The accompanying chart shows the progress since our merger. Last year the tankers we own or use under long-term lease experienced four small spills, with a loss of less than one teaspoon of oil for every million gallons transported.

Our marine safety and environmental performance has received worldwide recognition, including winning our third consecutive Sword of Honour award from the British Safety Council and the most recent U.S. Coast Guard William M. Berkert Gold award, "the premier national award that recognizes marine environmental excellence."

But more important than the awards are the results, and the way they have been achieved is instructive.

While the introduction of widely publicized enhancements, such as ships with double hulls, can reduce the risk of spills, even more impor-

tant is the approach used to prevent accidents and spills in the first place. Our approach has been to establish a comprehensive Operations Integrity Management System that, among other features, aims for zero marine-safety incidents.

We systematically assess the risks associated with each step in oil transportation and then initiate corrective or mitigating steps. The improvements we undertake include investments and procedures to reduce risks from both shore loading and shipboard operations.

For example, we emphasize thorough training of our employees, training that often exceeds regulatory requirements and focuses on corrective action long before an accident can occur.

A second major initiative has been directed toward careful vetting of the vessels that we charter to carry oil and the terminals where the oil is loaded.

This vetting process involves rigorous screening that will cover the management systems used by the charter company, the condition of the ship being offered, the cargo handling compatibility of the equipment, and the safety of the vessel routes being proposed for the shipment.

We also belong to many rapid-response organizations and engage in emergency-response drills to maintain a robust capability to limit the impact of any incident.

But the fundamental goal is zero accidents and zero spills. We are not quite there yet, and we will not be satisfied until we are.

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Taking on the world's toughest energy challenges.\*

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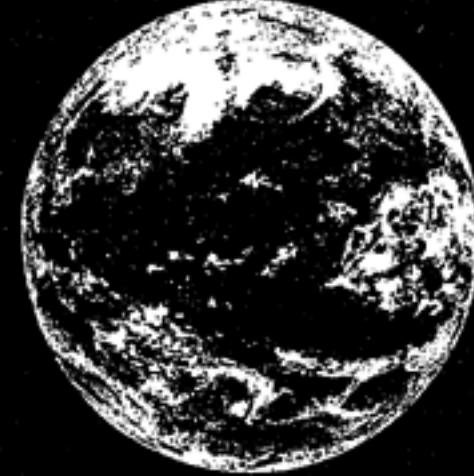
### RICO Statement Exhibit\_355

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lead our industry in research,  
reduce emissions by increasing efficiency,  
and help hundreds of communities grow?

We're all in this together.



In an ever-changing world, one challenge remains constant: our need for more energy and lower emissions. Which is why ExxonMobil is working to meet growing energy demands in an economically, environmentally, and socially responsible manner. In fact, in 2003 we once again invested \$600 million in energy technology. And we set a company record for energy efficiency in our refineries, which means reduced emissions. Meanwhile, we continued to play a vital role in contributing to the economic progress of developing communities in which we work – creating jobs, promoting health, sponsoring education, and fostering development of local businesses. Because while the world may indeed be changing, our commitment to good corporate citizenship never will. To find out more, see our 2003 Corporate Citizenship Report at [exxonmobil.com](http://exxonmobil.com).

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Taking on the world's toughest energy challenges.<sup>TM</sup>